

Borough



of Leicester.

THIRTY-EIGHTH

ANNUAL REPORT

UPON THE

HEALTH OF LEICESTER

ANNO DOMINI

1887,

And the proceedings taken to prevent
Adulteration of Food, &c.

BY

HY. TOMKINS, M.D., B.Sc., San. Sci. Dipl.,
&c.,

Medical Officer of Health; Medical Superintendent
to the Fever Hospital; Police Surgeon; Public
Analyst for the Borough, &c.

*Associate of Owen's College,
Member of Committee of the Manchester and Salford Sanitary
Association, &c.*

Corporation of Leicester

Sanitary Committee.

—: (o) :—

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Meets weekly, on Friday, at 3.30 p.m.

CONTENTS.

Part I.—SANITATION.

Health and Sanitary Condition in 1887. Notification of Infectious Disease. Prevalence of Infectious Disease. Scarlet Fever. Typhoid. Measles and Whooping Cough. Small Pox. Erysipelas. Puerperal Fever. Diarrhœa. Epizootic Disease. Swine Fever. Anthrax. Rabies. Sewers of Borough. Sewer Ventilation. Cremation. Open Spaces. Public Baths. Unhealthy Houses. Lodging Houses. Slaughter Houses. Factories, &c. Smoke Nuisance. Gas Impurities. Sanitary Legislation in 1887. Work of Sanitary Inspectors. Chief Inspector's Report.
..... *pp.* 7 to 62.

Part II.—FEVER HOSPITAL.

Patients Admitted in 1887. Statistics of Hospital. Hospital Expenditure. Cost per Bed, &c. Presents to Hospital.
..... *pp.* 63 to 69.

Part III.—VITAL STATISTICS.

Area, Population, and Density. Inhabited Houses and Rateable Value. Marriages. Births. Vaccination. Deaths and Death Rate. Mortality at Different Seasons. Leicester compared with other places. True comparative Death Rates. Deaths at different Ages. Infant Mortality. Illegitimacy. District Mortality. Causes of Death. Zymotic Diseases. Sickness from Infectious Diseases. Constitutional Diseases. Parasitic Diseases. Local Diseases. Developmental Diseases. Deaths from Violence. Deaths from Ill-Defined Causes. Inquests. Uncertified Deaths.
..... *pp.* 70 to 102.

Part IV.—ANALYST'S REPORT.

Articles of Food and Drink Analyzed. Adulterations of ditto. Well Waters Analyzed. Water from Corporation Mains.
..... *pp.* 103 to 107.

Part V. APPENDIX.

Meteorological Returns. List of Streets where Zymotic Deaths occurred. Mortality Tables, 1887. Disease Map of Borough.
..... *pp.* 110 to 120

Tables, Diagrams, and Tabulated Statements.

	PAGE.
Notification of Infectious Diseases in English Towns	9
Work of Sanitary Department in 1887	56, 58, 60, 61, 62
Statistics of Fever Hospital	64, 65, 67
*Population, Houses, Marriages, Births, and Deaths	71
*Annual Birth and Death-rates and Death-rate of Children	73
Death-rates of large English Towns	77
Comparative Death-rates ditto	79
Mortality at various Groups of Ages	80
Infantile Mortality of large Towns	81
Deaths from Infantile Diseases	82
Quarterly Deaths	83
Ward Mortality	84
Deaths in each of the large Groups of Disease	85
Diagram of principal Deaths	86
Deaths from Zymotic Disease	88
Ditto in the various Wards	89
Persons suffering from infectious Disease	90
*Zymotic Deaths in 1887 and ten preceding years	92
Scarlatina Deaths	93
Ages of Patients suffering from Scarlatina	94
Ages of persons suffering from Diarrhœa	97
*Deaths from certain Groups of Disease	99
Ward Mortality from Six important Diseases	100
Meteorological Returns	110
Mortality Tables classified into Ages and Diseases	116

NOTE.—The Tables marked * are drawn up in accordance with the suggestions made by the Society of Medical Officers of Health, with a view to securing more uniformity in the various Health Reports throughout the country.

H. T.

HEALTH DEPARTMENT,
TOWN HALL,
LEICESTER,
28th March, 1888.

To the Chairman and Members of the
Sanitary Committee.

GENTLEMEN,

I have much pleasure in presenting for your consideration my third Annual Report upon the Health and Sanitary condition generally of the Borough of Leicester during 1887, together with the year's report of the Fever Hospital, and the same of my work as Public Analyst.

It is gratifying to be able to point to a continued low death rate in the town, which not unfairly may be attributed in part, to the admirable Sanitary work which has, under your supervision and support, been in progress for some years past.

Amongst the many subjects touched upon in this report, two of paramount importance in Leicester I have treated at some length, namely, the undue prevalence of Summer Diarrhœa, and the vexed question of Sewer Ventilation.

I cannot refrain from expressing my regret, that you have not yet seen your way to take any steps to abate, or abolish, the nuisances inseparably connected with the existence of Slaughter Houses in our crowded localities; the more so, as the select parliamentary committee to whom is now referred all proposed legislative measures of a special sanitary character, have shewn themselves exceedingly desirous and willing to assist Health authorities in such matters (*see page 53*).

I avail myself of this opportunity also, to tender my thanks to the Editors of the Local Press for the insertion in their papers of my weekly health bulletin, &c., whereby those who take interest in the health of the town, are enabled to compare week by week, the statistics connected therewith.

And have the honour to remain, Gentlemen,

Your obedient servant,

HY. TOMKINS.

By an Order of the Local Government Board, dated March, 1880, Article 18, Section 14, it is prescribed, that every Medical Officer of Health shall—

- “Prepare an Annual Report to be made to the end of December in each
“year, comprising a summary of the action taken during the year for
“preventing the spread of disease and an account of the sanitary state
“of his district generally at the end of the year.
 - “The report shall also contain an account of the inquiries which he has
“made as to conditions injurious to health existing in his district, and
“of the proceedings in which he has taken part or advised under the
“Public Health Act, 1875, so far as such proceedings relate to
“those conditions.
 - “Also an account of the supervision exercised by him, or on his advice, for
“sanitary purposes over places, and houses that the Sanitary Authority
“have power to regulate, with the nature and results of any proceedings
“which may have been so required and taken in respect of the same
“during the year.
 - “It shall also record the action taken by him, or on his advice, during the
“year, in regard to offensive trades and to factories and workshops.
 - “The report shall also contain tabular statements of the sickness and
“mortality within the district, classified according to diseases, ages,
“and localities.”
-

CORRECTIONS.

- Page 19, line 2 from bottom, for “three growths” read “these growths.”
- Ditto ditto ditto, for “fig. A” read “fig. a.”
- Page 20, line 19, for “fig. 3” read “fig. b.”
- Ditto line 20, for “fig. C” read “fig. c.”
- Ditto line 22, for “fig. D” read “fig. d.”
- Ditto line 24, for “fig. E” read “fig. e.”
- Page 66, line 4 from bottom, for “sequete” read “sequela.”

Report of Medical Officer of Health, 1887.

Part I.

SANITATION.

Health and Sanitary Condition generally during 1887.—The health of the inhabitants of the Borough of Leicester, during the past year, as estimated by the ordinary test, of the prevailing death rate, shows a still further improvement on that of 1886. The death rate per 1000, per annum, reached the very low figure of 19·01, being 0·59 per 1000 below the preceding year, and 2·1 below the average of the past ten years. The death rate of England and Wales, in 1887, was 18·8, whilst that of the 28 large towns of the country was 20·8; so that Leicester may fairly congratulate herself on the position she takes on the health roll of the country, and especially so for a manufacturing town.

Mortality
compared with
other towns

It should, however, be borne in mind, that there are two factors which go to make our death rate unusually low: one of these being, that during the past few years the birth rate of the town has steadily decreased, and has this year fallen to no less than 32·7 per 1000. It is a well known fact to all students of vital statistics, that in our large towns a low birth rate is always accompanied by a low death rate, and *vice versa*. The other factor is, that the population of Leicester, as estimated by the Registrar-General, is probably put somewhat too high, and thus makes us appear rather better than we actually are. This will be referred to later on (see Part III.) But this error of *estimated*

Population
probably
over-estimated.

population, which is common to all communities, and can only be properly corrected at the taking of the census, does not, probably, involve an error of more than 0·3 or 0·4 per 1000. During the week ending June 11th, 1887, the death rate reached only 10·5, being the lowest of all the English towns, and is the lowest recorded rate in Leicester for any week in the last ten years; while on the other hand, in the week ending July 23rd, it had mounted up to no less than 32·0 per 1000 per annum, owing to the mortality from diarrhœa. From this it is evident how fallacious it is to form any conclusions from figures extending over short periods only.

Satisfactory as a low death rate of any community must always be, it should be remembered that this is not the only factor to be considered in the health condition of the people. The good results of improved sanitary surroundings should be seen not only in our lessened bills of mortality, but in an improved vitality; for length of life is, after all, not so important as the *length of time in each life* during which the individual is robust and healthy, and fit for the work he has to do.

Notification of Infectious Disease.—Unfortunately, we have at present no accurate means of gauging the *sickness rate* of the community, and we can only form a rough estimate from an analysis of our mortality tables, with the important exception of those ailments known as infectious diseases. Towns like Leicester, that have “compulsory notification” in force, are able to state not merely the number of deaths which have occurred during any given period, but also, what is of really more importance in forming any estimate as to the prevalence, or otherwise, of disease, *the actual number of persons who have suffered* from those diseases of which notification is enforced. Some 49 towns in the kingdom have at the present time power to obtain notification of infectious diseases, and the following table shews their comparative prevalence in fourteen of the largest of these towns during the year 1887 :—

Amount of
general sickness
unknown.

Number of Persons in each of the following towns,
who have been ill from the various Diseases
mentioned during 1887.

Name of Town.	Estimated Population.	Small Pox.	Scarlet Fever.	Diphtheria.	Typhus Fever.	Typhoid Fever.	Puerperal Fever.	Erysipelas.
Birkenhead.....	97,600	..	903	22	9	70	4	..
Blackburn	116,844	42	1717	1	..	150	..	..
Bolton.....	112,354	..	663	18	2	97	1	..
Bradford.....	224,507	4	1292	31	4	134	0	..
Derby.....	94,006	..	63	26	..	101	1	..
Huddersfield	90,034	..	523	66	3	44	3	..
Leicester	143,153	9	272	81	..	222	6	308
Manchester.....	376,895	67	2675	160	27	505	17	..
Nottingham	240,000	3	600	46	..	404	3	..
Oldham	134,158	2	1775	127	1	119	5	..
Portsmouth.....	137,916	21	625	250	..	579	9	..
Preston	102,283	1	883	47	..	297	6	..
Salford	200,241	6	1310	80	7	321	8	..
Sunderland.....	129,684	..	265	34	12	147	7	..

NOTE.—The above table has been compiled from the returns published monthly in the *Sanitary Record* during 1887.

Enquiry by
Local
Government
Board as to
working of Acts.

Hitherto, some of the largest and most important centres of population have abstained from acquiring these powers, amongst them being Liverpool, Exeter, Bristol, Birmingham, Leeds, and Sheffield, the latter town affording, by its present epidemic of small pox, a powerful argument in favour of making notification compulsory throughout the whole country. The Local Government Board has, during the past few months, obtained information as to the working of these local Acts, and applied to your Medical Officer of Health as to the success or otherwise of its operation in Leicester, and a quotation from last year's health report, when treating on this subject, was given. The President of the Local Government Board has recently stated, in the House of Commons, that the Government have under consideration the desirability of shortly bringing in a Bill applicable to the country at large, a measure which, by communities situated as Leicester is, with a large population bordering upon its outskirts, and yet not under its control or supervision, should be hailed with much satisfaction. On more than one occasion, during the past year, cases of dangerous infectious disease have been discovered just outside the Borough boundaries, which, but for the prompt information voluntarily given by the medical man in attendance, and the vigilance of our own Inspectors, might have proved centres of wide-spreading infection. In two instances these were cases of Small Pox, and in two other instances Scarlet Fever convalescents were discovered, in a most infectious condition, mixing with children in the Borough, the street in which they lived being continuous with that within the municipal boundary.

Necessity for
extension of
notification
of infection.

Prevalence of Infectious Disease.—During the year, 898 persons have been known to have suffered from the following infectious diseases :—Small Pox, Scarlet Fever, Diphtheria, Typhoid Fever, Erysipelas, and Puerperal Fever; by far the lowest number recorded in any one year since notification came into force within the Borough. In the previous year, 1280 were reported as suffering from the same diseases, and this was at that time the lowest number during any previous twelve months. Of

the above 898 cases, no less than 308 were Erysipelas, a disease which can scarcely be said to be a danger to the community at large, and the greater number of which have also been of a very trivial character, leaving only 590 as the number of persons suffering from the dangerously infectious disorders. They were distributed as follows:—Scarlet Fever 272, Typhoid Fever 222, Diphtheria 81, Puerperal Fever 6, and Small Pox 9. These figures take no account of the two common zymotic diseases, Measles and Whooping Cough, which periodically carry off large numbers of children, and which are not included in the list of those to be notified.

Trivial nature
of many
Erysipelas cases

The complete figures compared with previous years will be found in Table XIII., Part III.

Scarlet Fever.—One of the most satisfactory features of this report is the diminished prevalence of Scarlet Fever, after having existed in a more or less epidemic form, within the Borough, for the past nine years; and this is the more striking when it is considered how very extensively this disease has prevailed in other parts of the country, during the past year. In October and November last, the hospitals of the Metropolitan Asylum Boards were filled to overflowing, and contained at one time more than 2500 patients.

Diminution of
Scarlet Fever.

Seeing that we have now got to so low an ebb, that only about three fresh cases per week are at the present time being met with, we may have some hope that, with the co-operation of the friends of those patients, whose homes do not afford the means of any real isolation, by permitting them to be removed and treated at the Fever Hospital, this disease may be held in check, and prevented from assuming again such large proportions as heretofore.

On looking back, however, into past years, and noting how marked a tendency there has been to periodical waves of epidemic prevalence of Scarlet Fever, followed for a short time by a sub-

sidence, one must not be too sanguine about the future course of this disorder.

(For statistical details, see Part III.)

Typhoid Fever.—This disease has been more prevalent than in the previous year, when only 141 cases were recorded, with 27 deaths. In 1885, there were 216 cases with 37 deaths, whilst during the year under review 222 persons have suffered, of whom 31 have died. The number of cases in the first and second quarters of the year did not exceed the usual average number, but at the end of August and during September there was a sudden increase, when as many as 20 fresh cases were reported in a single week. This sudden outburst slowly decreased during November and December; but even up to the time of writing there are more cases occurring weekly than is usual during the winter season of the year. As to the causes to which this increased prevalence was due, it is not possible to speak with certainty. In all probability, climatic conditions had a large share in its production: the exact relation of typhoid and varying meteorological phenomena has not yet been satisfactorily elucidated. We had a sudden and early onset of hot weather in July, accompanied by an unusually low rainfall during the summer and autumnal months. There have also been some local conditions, which in many instances were suspected as being factors in its production. Thus, along the line of the new drainage works, which of necessity disturbed the old sewers, together with the surrounding sewage-contaminated soil, cases were met with in considerable numbers. Again, running along the boundaries of the Borough, are two brooks, one on the Aylestone side of the town, the other, the Willow brook, on the Humberstone side: both these were in a condition most foul, and gave rise to constant and loud complaints, and which condition, undoubtedly, was the origin of some of these cases.

In fact, the district of New Humberstone was the seat of a very extensive outbreak of the disease, so much so that public

Increase of
Typhoid
in 1887.

causes of ditto.

meetings were held to protest against the sanitary shortcomings and neglect which were found to be in existence there. Speaking generally of the Borough, the cases were localized to no particular districts or parts of the town, but were scattered more or less regularly throughout the Borough. Owing to the increased demand made upon the Infirmary Fever wards, the Sanitary Committee was asked to make arrangements to receive into the Borough Fever Hospital those patients for which room could not be found in the Infirmary; and during September and October cases were received into our own Fever Hospital from both town and county.

(See Hospital Report, Part II.)

Measles and Whooping Cough.—Both Measles and Whooping Cough were more fatal, and therefore presumably more prevalent than in the previous year; Measles prevailing most in the first quarter of the year, whilst during the last six months the town was almost free from it. On the other hand, Whooping Cough prevailed more extensively in the last quarter of the year than in the preceding nine months.

Prevalence of
Measles and
Whooping
Cough.

Small Pox.—The most noteworthy fact in connection with infectious disease, during the year under review, was a slight outbreak of Small Pox, occurring in November last, which has attained much notoriety throughout the country, and concerning which much exaggeration and misstatements have been indulged in by misinformed writers in the public press, and others.

Slight attack of
Small Pox.

The facts shortly stated are as follows:—About the middle of November, a boy residing in Gresham-street was attacked with a mild eruptive fever, which was thought by the medical man in attendance to be Chicken Pox; four other children in the house subsequently contracting it from him, the youngest of these being a child four years of age, *unvaccinated*, and in whom the disease, instead of running a mild, abortive course, developed

in the usual manner seen in an unvaccinated person. The disease was then recognized as Small Pox, and the whole of the patients were at once removed to Hospital; whilst the father and mother and three other children were removed into the quarantine wards, where two of the latter, within a few days, developed the disease, and passed through a most trivial attack, they being both well protected by efficient vaccination in infancy. From these cases one other arose, on the other side of the town, in the person of a young man who had visited the former family. This patient had been vaccinated in infancy, and the attack was also of a trifling description. After diligent search and inquiry, the source of infection of this outbreak could not be satisfactorily ascertained: the father had been working in Warwickshire, coming home periodically to his family, and it is possible he may have unknowingly brought the infection, without himself suffering from the disease.

Small Pox on
the Borough
boundaries.

On the 10th December, another case was discovered by a medical man, just outside the Borough boundaries, on the New Humberstone side, who, though under no obligation to do so, promptly brought word to the Health Office of its existence; and as the house was only a few yards over the limits of the Borough, with the approval of the Medical Officer of Health for the county, this case was also promptly removed to the Borough Hospital, and the patient's family taken into quarantine. No extension took place. The disease in this case was undoubtedly contracted at Sheffield. The attack was a very mild one, the patient shewing evidence of efficient vaccination in infancy. On the 14th December, another case was reported in Brandon-street. The same measures were adopted: prompt removal of the patient to Hospital, of his family to quarantine, and thorough and efficient disinfection of all infected things and rooms; and no extension of the disease from this case occurred. This man was unvaccinated, and suffered most severely, barely escaping with his life.

In each of the above families, those children who had not been vaccinated were at once vaccinated, and where it was

deemed advisable re-vaccination was performed on the older persons who had been exposed to infection, and who were willing to submit to it, as a safeguard for their own personal safety. Since the commencement of the present year (1888), eight other cases have been met with in the town: three children in one family unvaccinated, and one man unvaccinated, have suffered severely; the other four vaccinated patients have had but very mild attacks. To those who have carefully watched these sporadic cases, cropping up in various parts of the town, and the means adopted to arrest their spread, it is self-evident that prompt notification, and removal of the patients and infected persons from the midst of the community, have been our mainstay against the extension of this most infectious disorder; and no small credit is due to the Inspectors, and especially to Inspector Braley, for his energy and aptitude in following up and discovering every person known to have been exposed to the infection of any of the above cases, and for the vigilant watch kept over those who were suspectedly infected. Had any such efficient system been in force at Sheffield, it need not have been to-day suffering from a wide-spread epidemic, which has got beyond all control.

Means taken to
prevent
its spread.

The exaggerated statements and wild reports which have appeared in all parts of the country, with respect to the few cases we have hitherto had, both as to the number of cases that have occurred and also as to the measures adopted, are calculated to excite amusement in the minds of Leicester inhabitants. One paper gravely assured its readers that the eyes of the whole country were upon us, and the popular opinion in other places is that Leicester, so far as vaccination is concerned, is an entirely unprotected town, a supposition quite opposed to facts. Even well-informed medical and sanitary writers often appear to think that at least the bulk of the children here, under ten years of age, are unvaccinated. By turning to the statistics of vaccination, given in Part III., it will at once be seen that this is a misapprehension. It is only since the year 1885 that the compulsory laws respecting vaccination have not been enforced, and up to

Diminishing
amount of
vaccination in
Leicester.

that year by far the larger number of children born were vaccinated. Even so late as the year 1886 there were 1122 vaccinations performed; but at the present time, as no compulsion whatever is brought to bear on parents, the vaccinations are but few in number, amounting in 1887 to only 474. It has been supposed that there has been as great, or greater falling-off in vaccination amongst the educated and well-to-do, as amongst the poorer and less educated classes: this statement is not borne out by the vaccination statistics obtained from the Clerk to the Guardians.

The only other Zymotic Diseases that call for notice here are Erysipelas and Puerperal Fever.

Useless expense
in reporting
Erysipelas.

Erysipelas.—Three hundred and eight cases of Erysipelas have been notified. Although at first sight, and judging from the figures alone, the prevalence of Erysipelas appears to be alarming, in reality it is not so, for, as has been stated previously, a very large proportion of these cases are of the slightest character, frequently following some injury or wound, and which have no significance from a sanitary point of view, as bearing upon the prevalence of zymotic disease. Leicester stands almost alone in having Erysipelas notified, and if the expected forthcoming Bill, dealing with notification of infectious disease, does not provide facilities for health authorities to remove from or add to the list of diseases to be notified, the advice given to the Council last year, to obtain powers to erase this from the list, may be once more repeated.

Puerperal Fever has caused both less illness and fewer deaths than in 1886. Only six cases have been reported; but it was deemed advisable in three instances to ask for a temporary abstention from practice, on the part of three midwives, whose patients had suffered from this dangerous disease, the Sanitary Committee making some pecuniary compensation during the time they were prohibited from work.

Diarrhœa.—During the summer of 1887, in common with the country at large, Diarrhœa was less fatal here than in the preceding year, 256 deaths being registered as due to it (for statistics see Part III.) The onset was sudden and severe: the first death occurred in the week ending 25th June, the numbers rapidly increasing to three, twenty, thirty-two, and forty-five, in the four succeeding weeks, and declining less rapidly, as the heat fell, until about the second week in September. As in previous years, medicine was given away in the poorer districts of the town, and no less than 9904 patients were thus supplied, shewing how extensively the disease prevailed, although nine deaths less were caused by it than in 1886. In the year 1880, when 390 deaths were caused by it, 8284 patients were supplied with medicine; and in 1884, when 344 lives were lost, 10,892 were supplied.

Rapid onset of
Diarrhœa.

The extremely virulent nature of the attack in many cases, this year, was markedly seen in adults; and amongst a strong body of men such as the police force, cases occurred which in the suddenness of the collapse, the muscular cramps more or less of the whole body, and the character of the vomit and stools, bore a very marked resemblance to the clinical features of true Asiatic Cholera.

With a view to check if possible the spread of the disease, an experiment was made, first in the more densely crowded districts and narrower streets of the town, of watering twice daily the surface of the roads with water impregnated with carbolic acid, or Sanitas.

Street watering
with
disinfectants.

Whether it was *post hoc* or *propter hoc*, one year's experience is not sufficient to say, but there was a marked and undoubtedly rapid decrease of deaths in these localities, so that the Sanitary Committee sanctioned an extended use of the same to other parts. In most of these streets there had never previously been any daily watering, and many of the inhabitants expressed much satisfaction at the grateful relief from the heat, produced by this

liberal use of water. It is certainly worth while that this practice should be again adopted, and even extended during the coming summer.

The bacteriological observations referred to in last year's report were continued, and at the close of the summer a resumé of the same was presented to the Sanitary Committee, of which the following is a somewhat extended and amplified copy :—

A Report to the Sanitary Committee upon some observations made during the summer of 1887, relating to the prevalence of Diarrhœa within the Borough of Leicester.

MR. CHAIRMAN AND GENTLEMEN,

During the past summer I have continued my researches and enquiries into the causes at work within your Borough, which yearly produce so large an excess of mortality from Diarrhœa, in comparison with most of our other English towns. That there exists a large excess here only too much evidence is forthcoming to prove, and that some special local cause or causes are at work is also demonstrable.

It has been shewn more than once that Leicester, as a manufacturing town, is much on a par with other towns of its class, so far as pertains to the care and rearing of its infant population, among whom the mortality chiefly occurs. But the time has come to take a much larger view of this disease, and not to confine attention merely to the infantile portion of the community. We possess ample statistics now, to show that all ages, classes, and occupations are attacked.

Out of nearly 10,000 persons known to have suffered during the past summer, almost two-thirds were 20 years of age and upwards. I shewed last year that the disease prevailed more extensively in certain districts of the town, and this district, which is coloured pink on the map appended to this report, I have called the "Diarrhœa Area."

During the summer of 1887, I have chiefly been occupied in carrying on bacteriological observations as to the existence or otherwise of an excess of microscopic forms of life, or micro-organisms and their spores, in the air of the various parts of the town, and they have generally speaking served to confirm the results obtained in the summer of 1886.

In this work, I have made use chiefly of Hesse's apparatus for the examination of air, employing as the media for cultivations, nutrient gelatine, either neutral or with a slight trace of free acid. I have examined the air in Woodboy-street, Waring-street, Victoria Park, Bonner's-lane, Russell-square, Asylum-street, and All Saints' Open. Without going into detail, the results briefly were as follows, the tubes in which the growths developed being all kept at about the same temperature, namely, from 63° to 65° F., and in every instance three litres of air were operated on.

		Day from collecting air.	Total organisms in 3 litres of air.	Bacterial forms.	Moulds.
1st series	Woodboy Street ..	On 6th day	32	19	13
	Waring Street ..	"	10	5	5
	Victoria Park ..	"	21	7	14
	Bonner's Lane ..	"	29	15	14
	Russell Square ..	"	13	8	5
2nd series	Asylum Street ..	3rd day	20	14	6
	All Saints' Open ..	4th day	14	8	6
	Russell Square ..	5th day	25	17	8

It is probable that the bacterial micro-organisms are of much more importance than the ordinary common moulds, the spores of which always exist in the air. Looking at the former only, it is seen that they varied in number from upwards of 6000 per cubic metre to only about 1600 in Waring-street and 2300 on Victoria Park: these two latter localities being, as you are aware, outside the "Diarrhoea Area." It will be noticed that Russell-square is recorded twice. In the first series, just before the observation was taken, a heavy thunderstorm came on, and only eight bacteriae were found present, whilst at the same spot, two days after, no less than seventeen were present, agreeing more closely with former observations in this district. This is rather an important fact, and looks as though the rain, in addition to cooling the air, washed down with it a large number of its microbes and their spores.

Besides the simple statement of the number of organisms found, other particulars require to be stated, the significance of which will be fully appreciated only by those who have some special knowledge of bacteriology. I allude to the different results of the action of these growths upon the nutrient material. It will be seen that in the first column a day is denoted: this refers to the last day, from the time of passing the air through the apparatus, on which the final enumeration of growths was made.

These

In fig. A on the accompanying Plate ~~three~~ growths are represented (the tube being drawn to half scale).

In each of those tubes in which the air had been obtained from Wood-boy-street, Russell-square, Bonner's-lane, Asylum-street, and All Saints' Open, towards the fourth day the nutrient material shewed signs of liquifaction, so that after the sixth day it was not possible to count or properly distinguish the separate growths. In that from Asylum-street this process had by the third day arrived at this stage, in that from All Saints' Open on the fourth day, and in the second sample, from Russell-square, on the fifth day.

Further, this liquified gelatine was now converted into a dirty-looking, offensive-smelling fluid, swarming with micro-coeci, in chains and masses, together with some short bacilli, apparently much less in number.

The tubes taken from Waring-street and Victoria Park remained free from liquifaction to a large extent, and had a much less offensive odour.

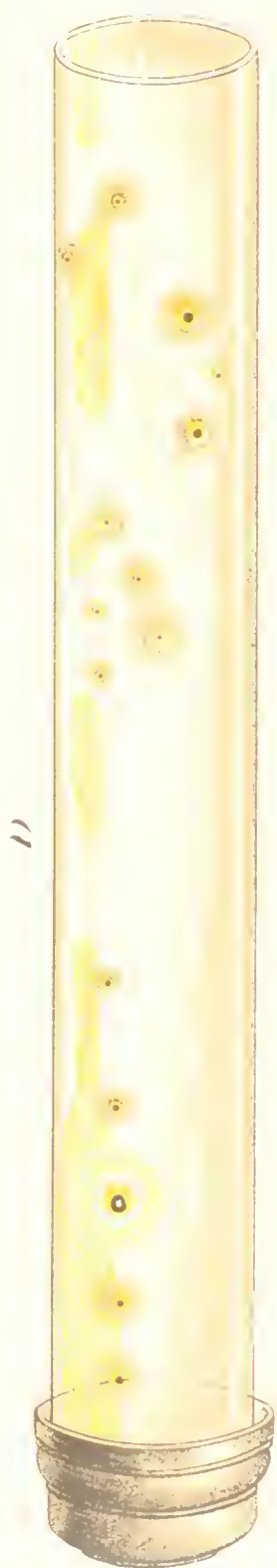
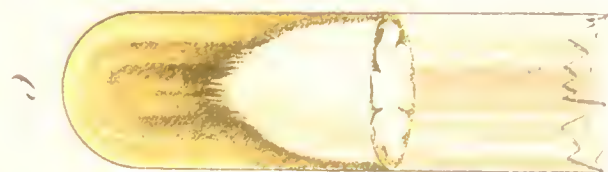
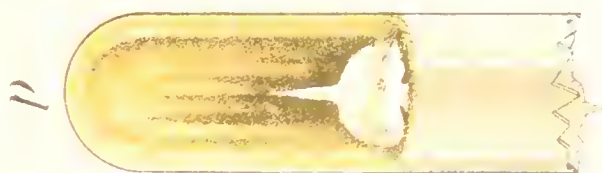
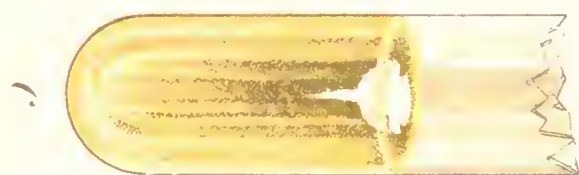
Cultivations were made from this liquified material in the usual manner, with a sterilized needle, into gelatine tubes, with the following result :—

The needle was inserted into the nutrient media to the depth of something over half an inch, and the tubes were kept at a temperature of about 65° F. On the second day there was a slight opalescence visible along the needle track; on the fourth day there was a small white patch on the surface, and the needle track was distinctly visible, as shewn in fig. *b* (see plate); by the sixth day it presented the appearance of fig. C; on the ninth day the whitish patch on the surface had spread, and the gelatine was becoming liquified in the cup-like manner seen in fig. D.* This process of liquifaction proceeded steadily until the depth to which the needle had been inserted was reached, so that on the twelfth day the appearance was that represented by fig. E. It then stopped, or proceeded so slowly, that in four more days but little change was apparent to the eye. The tubes were then opened, and the same offensive odour was found to be present, though not quite so strong as that in the Hesse's tube from whence they had been inoculated. In like manner, as described last year, exceedingly small quantities of this infected liquified gelatine, swarming with the micro-organisms mentioned, sufficed, when taken into the system, to induce a smart attack of diarrhoea, lasting several hours.

The micro-organisms of the second cultivation were, for the greater part, micro-coeci of considerable size, but they presented no special morphological appearance to distinguish them from many like organisms of this kind.

Whether the presence of one or more of these microbes in the atmosphere be the direct cause of this summer Diarrhoea or not, I think it can be abundantly demonstrated, both by a process of exclusion and from positive evidence,

* In the drawings the liquified part of the nutrient gelatine is made too white in colour, it should be of a dirtier hue.—H.T.





that it is *due to something in the air*, which exists only, or more abundantly after the on-set of the summer heat, and which also, whatever it may be, is at work more actively in some districts than others.

That the cause is one common to, and affecting all ages, classes, and occupations, we know; therefore it cannot be causes which some observers have thought, such as teething, improper food, maternal neglect, congenital debility, and the like: these affect infants only, and are at work the whole year round, whilst this disease exists for only a very limited and well marked period. By the same reasoning, it is easily shown that many other supposed causes cannot be the *causa vera*.

Up to the present time, our actual knowledge has not gone beyond the fact that whatever the direct cause, *an increased temperature* is the one condition without which the disease does not develope.

But that *heat alone* is not the *only* essential factor is also easily proved. The summer temperature of this country does not vary to any considerable degree in towns adjacent to one another, and yet the difference among them in the prevalence of and mortality from diarrhœa is enormous.

That it is not due to any special constitutional tendency of those who dwell in Leicester is well seen by the following:—During the past three summers, *i.e.*, 1885, 1886, and 1887, I have had under my care at the Fever Hospital large numbers of children. During the summer of 1885 the weekly numbers in the wards ran from 100 to 150 patients, in 1886 from 50 to 70, and in 1887 from 12 to 20. The bulk of these were children, all from the Borough, and largely from those parts of the town where Diarrhœa most prevails. The Hospital is situate well outside the limits of the Borough, on rising ground. The temperature registered here was the same as that in the centre of the town, and yet Diarrhœa was practically absent amongst the whole of these large numbers, ample evidence that it is *not heat merely* that is required to produce it. Again, amongst my own personal acquaintances, during last summer, in more than one instance, those with a family of young children, who had suffered severely in former years from the disease, took them only a few miles out of the town to an elevated rural district, before the heat of July commenced, with the result that they entirely escaped any attack whatever, although, as far as the thermometer is concerned, the temperature was practically the same as in Leicester.

With the above facts before us, I will endeavour to shortly place before you what, so far, are my own conclusions upon this intricate problem; and here it is necessary for a few minutes to look into the past records of Leicester, and see what light from these may be thrown upon it.

Prior to 1851, I have not been able to find any reliable data as to the annual mortality from Diarrhœa here, but there is some collateral evidence available, which I think is not without value. It is well known, and reference to the annual health reports of the Borough shew, that the third quarter of the year always has the largest number of deaths recorded in it, and that this excess is caused principally by the diarrhoeal mortality of young children.

The systematic registration and tabulation of deaths commenced in England about 1839. The records of that period shew that there was not then any marked excess of deaths in Leicester during *the third quarter of the year*. I append the figures so far as I have been able to find them for these early years.

Quarterly Deaths in the Borough of Leicester in the following years.				
YEAR.	1st Quarter.	2nd Quarter.	3rd Quarter.	4th Quarter.
1845.....	445	432	458	354
1846.....	342	305	436	460
1847.....	442	327	343	345
1848.....	353	379	353	401
1849.....	516	411	360	402
1850.....	351	302	367	393

From the above it is evident, that to whatever extent Diarrhœa existed at that time, it did not swell the mortality bills of the third quarter of the year as it does at the present time.

More than twenty years ago, Dr. Sloane, when making some enquiries in connection with this disease, noted that in the early years of the century, *i.e.* so far back as 1808 and 1809, an examination of the London bills of mortality failed to shew the excess of deaths in the summer months that we now have, and, quoting from Dr. Buchanan, said, "where then was the Diarrhœa of July and August." We may assume that forty or fifty years ago Diarrhœa did not cause the deaths that it does to-day either in Leicester or London. Against this argument it may be said that we have, by improved hygienic measures adopted since that time, and by a generally improved condition of the masses of the people, appreciably affected the general death rate, so that the bulk of disease and death has been lessened, whilst Diarrhœa has remained stationary, or only slightly increased, and thus stands out more prominently at the present day.

From an examination of the vital statistics of the Borough, I find that it was not until about 1850 that the deaths in the third quarter of the year were

in so large excess of the second quarter, but since that time this has gone on continuously, and without interruption, as the following figures show:—

Year.	1851.	1852.	1853.	1854.	1855.	1856.	1857.	1858.	1859.	1860.
Deaths 2nd qr.	323	374	348	421	366	335	304	466	335	366
Do. 3rd qr.	438	501	494	399	334	352	483	483	391	268*

Year.	1861.	1862.	1863.	1864.	1865.	1866.	1867.	1868.	1869.	1870.
Deaths 2nd qr.	?	?	?	-	-	?	450	507	483	456
Do. 3rd qr.	?	?	?	-	-	?	618	788	688	778

Year.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.
Deaths 2nd qr.	498	686	553	?	604	551	601	531	?	594
Do. 3rd qr.	779	796	738	?	907	848	773	863	?	946

Year.	1881.	1882.	1883.	1884.	1885.	1886.	1887.
Deaths 2nd qr.	562	587	616†	583	602	588	570
Do. 3rd qr.	818	737	604	942	746	829	782

If, then, it is during the last forty or fifty years that this mortality in the third quarter of the year, due chiefly to diarrhoea deaths, has arisen and come to be such a prominent feature in the mortal statistics of the Borough, one is naturally led to enquire if any and what agencies have been at work tending to bring about this result during that period. The second annual health report of Leicester, by Mr. John Buck, Officer of Health in 1851, shews how filthy was the condition of many parts of the town at that time, and the system or want of system of sewers was as bad, or even worse, than those that are now being replaced. In fact, this report shews that the Borough generally, was then, and had been for some time past, in a most unsatisfactory sanitary state. In 1855 a new system of sewers was completed, but the process of properly connecting all the subsidiary ones, necessarily occupied much time; and owing to the rapid increase of population, and from other causes, in a very little more

* In 1860 only fifty-six deaths from diarrhoea were recorded.

† The figures for the years 1861, 1862, 1863, 1864, 1865, 1866, 1874, and 1879, I have not been able to obtain.

‡ In 1883 there appears to have been an unusual number of deaths in the second quarter of the year from respiratory diseases.

than a dozen years this new system failed to fulfil the work required of it, backing up of drains into houses, and even overflow of drains into streets, becoming common. In addition, periodical floodings of the lower parts of the town not unfrequently occurred, whilst open cesspools and privies still existed to an enormous extent. In 1868, a sub-committee of the then Board of Health, appointed to consider this question, reported that in their opinion one of the chief factors in causing this disease was the existence of open privy cesspools in the town, and in 1872 it is known that between six and seven thousands of these existed, chiefly in what we know as the old parts of the Borough. All this, together with what we now consider a lax sanitary supervision of the town, tended to bring about a polluted condition of the soil and surroundings of the houses, a pollution, too, of the most objectionable character, *i.e.*, with animal organic refuse. That polluted soil and air are efficient causes in producing specific disease has long been a fact known to medical men. Districts spoken of as malarial are usually those lying low, damp, and often with a luxuriant vegetation, producing "ague," jungle fevers, &c. In these cases it is probable that the decay of vegetable matter, with a damp or swampy soil, is the prime factor.

Farmers and stock keepers are often made familiar with the effects of the flooding of lands by rivers and streams, especially if those be polluted. Animals turned out to graze upon the grass which grows abundantly, it may be, on this flooded land, are often affected with "scouring." These facts are not without significance in considering the problem now before us.

Speaking generally, Leicester is situate upon clay, beneath which lies the new red sandstone; but following the bed of the river for a variable distance, on either side, alluvial deposit is found, consisting of sand, gravel, &c., of a varying thickness, from the river townwards. This does not extend much beyond High-street and Belgrave-gate. Overlying all, of course, is a variable amount of soil. What I now wish to lay stress upon is this, that from the above causes the whole of the subsoil of the inhabited part of the town has, for something like half a century at least, been almost constantly polluted in the manner described. In those parts where the clay comes near to the surface, the small covering of soil has had scarcely any chance to purify itself, while in those parts where the more porous gravel and sand overlies it, until very lately the periodical flooding by the river, and overflow and leakage from imperfect sewers, has sufficed to keep it more or less constantly contaminated.

I think I am justified in stating, therefore, that the subsoil of the Borough is, and has been for a long time past, in a polluted state, and in many localities actually sewage-sodden.

It is to be borne in mind that all superficial soils contain a considerable amount of air, and that this sub-soil air is constantly moving, under the influence of varying meteorological and climatic conditions.

Amongst the mass of information acquired in recent years, by scientific workers, in connection with the development and life history of the lowest known forms of living organisms, one of the most elementary facts is, that given dead organic matter, plus warmth, and these microscopic forms of life increase and multiply to an extent almost inconceivable.

Many of my predecessors, or probably more correctly, I should say, all who have gone before me, in endeavouring to find the true explanation and cause of Leicester's excess of diarrhoeal mortality, have attributed to an increased temperature the most important position as a causative factor, though the manner in which heat brought about the disease, has been matter of much diversity of opinion. Many and elaborate records have been taken in various parts of the town of the daily maximum, minimum, and mean temperature, and the broad fact came out that, soon after the maximum temperature reached 60° F. to 65° F., then the disease commenced.

I believe, however, that not sufficient attention has been paid to other points in connection with the temperature, and, more especially, as it affects other matters besides the atmosphere. All the above are records of the *air temperature only*, which is liable to very sudden changes from many causes; and further, they give no information as to the length of time during which the maximum temperature existed on any given date: it may have been for a few minutes only, or for several hours daily. In the *temperature of the earth*, we have, however, a much more stable factor to do with. The soil will become heated in proportion to the length of time that the maximum heat of the sun plays upon it, and, of more importance still, its temperature will not fluctuate so rapidly as the temperature of the air does; but when the heat has penetrated one or two feet into the ground, it will be retained for comparatively long periods of many hours. I have, therefore, specially considered the earth temperature, and the following table shews, not merely the maximum and mean aërial temperatures, but also the temperature of the earth at depths of one foot and of four feet, side by side with the daily number of deaths occurring from diarrhoea in each of the three past years.

1885.						1886.						1887.					
Date.	Mean Temp.	Max. Temp.	Deaths	Diarrhoea.	Earth Temp. 1 ft. 4 ft.	Mean Temp.	Max. Temp.	Deaths	Diarrhoea.	Earth Temp. 1 ft. 4 ft.	Mean Temp.	Max. Temp.	Deaths	Diarrhoea.	Earth Temp. 1 ft. 4 ft.	Mean Temp.	Max. Temp.
June 22	54.8	61.0	..	..	58.9 55.0	54.3	59.5	..	..	54.5 52.7	59.0	72.3	1	..	60.0 54.0	..	..
" 23	60.0	66.6	..	..	59.4 55.1	55.3	62.8	..	..	54.8 52.6	61.7	72.6	..	..	60.8 54.2	..	..
" 24	62.5	68.6	..	..	60.1 55.0	57.2	67.8	..	..	55.7 52.6	56.9	68.0	..	..	60.3 54.5	..	..
" 25	51.6	53.5	..	..	59.6 55.2	58.7	66.8	..	..	56.3 52.5	57.2	69.0	..	..	59.7 54.8	..	..
" 26	54.2	62.3	..	..	57.9 55.2	61.6	71.0	..	..	57.2 52.7	55.8	68.2	..	..	59.0 54.0	..	..
" 27	53.7	67.0	1	..	58.2 55.2	59.3	68.8	..	..	58.2 52.6	61.8	81.0	..	..	60.1 55.0	..	..
" 28	57.2	68.0	..	..	59.2 55.2	68.6	74.0	1	..	59.5 52.9	61.5	71.7	..	..	61.2 55.0	..	..
" 29	57.0	66.2	2	..	60.0 55.3	64.4	70.5	..	..	60.2 53.2	62.3	72.2	1	..	61.6 55.0	..	..
" 30	55.7	61.0	1	..	60.0 54.3	62.1	71.6	..	..	60.8 53.2	63.9	74.3	1	..	63.6 55.2	..	..
July 1	55.0	68.0	1	..	58.9 55.0	61.7	74.5	..	..	63.7 53.8	63.9	76.0	1	..	62.3 55.3	..	..
" 2	60.1	73.5	..	..	60.5 55.6	67.6	78.6	..	..	62.1 54.0	68.9	80.6	..	..	63.3 56.6	..	..
" 3	61.8	66.3	..	..	61.8 55.8	70.4	81.9	..	..	63.2 54.2	69.1	84.0	2	..	63.6 55.8	..	..
" 4	61.9	75.0	2	..	61.6 55.9	71.5	83.1	..	..	64.5 54.6	70.7	82.2	2	..	63.7 55.9	..	..
" 5	62.7	75.8	1	..	62.5 56.0	65.4	74.8	..	..	64.1 55.0	59.0	67.1	5	..	63.0 56.1	..	..
" 6	62.8	74.5	1	..	62.9 56.1	67.0	80.8	1	..	64.0 55.2	57.0	71.0	4	..	62.7 56.3	..	..
" 7	59.9	69.0	2	..	63.2 56.3	65.4	74.5	1	..	64.2 55.7	67.4	78.8	3	..	64.6 56.5	..	..
" 8	62.4	71.0	1	..	63.5 56.6	59.1	65.3	..	..	62.6 56.0	70.5	83.2	4	..	66.4 56.7	..	..
" 9	59.3	70.6	1	..	62.6 56.8	54.2	61.0	..	..	60.5 56.1	67.3	73.5	4	..	66.8 56.9	..	..
" 10	63.0	77.8	3	..	63.6 57.0	58.0	66.0	2	..	60.3 56.3	65.3	73.2	8	..	64.6 57.0	..	..
" 11	64.8	75.6	6	..	64.3 57.1	61.8	69.0	1	..	61.2 56.2	71.3	75.6	4	..	65.6 57.0	..	..
" 12	61.1	68.0	2	..	64.0 57.5	64.1	68.4	..	..	61.6 56.2	68.8	79.5	4	..	66.0 57.5	..	..
" 13	57.6	68.0	1	..	63.2 57.8	59.0	67.5	1	..	60.3 56.3	69.2	77.0	4	..	67.1 57.5	..	..
" 14	59.4	70.6	3	..	63.8 57.8	58.1	67.0	2	..	60.8 56.4	63.3	69.6	5	..	65.1 57.7	..	..
" 15	55.0	67.8	3	..	63.0 57.9	55.8	63.3	2	..	59.0 56.5	64.9	74.0	3	..	65.8 57.9	..	..
" 16	59.3	62.3	3	..	64.0 58.0	56.9	65.2	2	..	58.3 56.5	63.5	73.0	6	..	66.4 58.0	..	..
" 17	58.3	65.5	4	..	61.8 58.0	57.5	66.5	..	..	58.9 56.4	55.8	65.2	8	..	66.6 58.0	..	..
" 18	60.4	69.0	5	..	61.8 58.0	65.3	75.8	1	..	60.5 56.5	56.4	70.0	6	..	66.5 58.1	..	..
" 19	65.7	70.5	5	..	63.5 58.0	66.2	73.4	3	..	62.3 56.3	60.8	75.8	7	..	64.2 58.0	..	..
" 20	64.2	70.8	2	..	63.0 58.1	63.3	72.6	1	..	62.1 56.6	66.1	79.2	2	..	64.9 58.0	..	..
" 21	63.3	70.6	6	..	62.6 58.0	68.2	80.2	2	..	63.0 56.9	65.7	74.0	9	..	66.3 58.0	..	..
" 22	64.3	75.3	6	..	64.2 58.1	64.3	70.0	..	..	63.5 56.9	66.7	79.8	6	..	66.0 60.0	..	..
" 23	64.2	75.5	7	..	64.3 58.2	62.1	66.1	3	..	62.2 57.0	62.7	74.8	1	..	65.1 58.1	..	..
" 24	66.5	79.9	7	..	64.3 58.3	60.8	65.0	3	..	62.0 57.0	64.6	75.0	3	..	65.3 58.5	..	..
" 25	71.0	88.0	9	..	66.2 58.5	60.9	71.2	6	..	61.2 57.5	63.3	71.4	8	..	64.1 58.6	..	..
" 26	72.6	85.4	1	..	68.7 58.8	59.5	68.3	4	..	61.8 60.6	64.8	76.0	9	..	64.7 58.8	..	..
" 27	71.9	81.0	2	..	68.0 59.0	54.2	56.8	3	..	61.2 57.3	64.3	74.0	4	..	65.2 58.8	..	..
" 28	61.4	70.6	5	..	66.6 59.1	54.8	63.2	3	..	59.5 57.3	64.6	74.0	3	..	64.8 58.9	..	..
" 29	61.0	67.2	2	..	66.0 59.4	57.0	62.8	2	..	59.9 57.4	65.7	72.6	2	..	64.1 59.0	..	..
" 30	60.4	69.0	1	..	64.1 59.7	61.2	65.6	3	..	60.3 57.3	62.4	71.5	2	..	63.2 59.0	..	..
" 31	53.8	68.1	2	..	63.4 59.9	59.7	64.2	4	..	60.3 57.3	61.8	71.2	9	..	62.6 59.0	..	..
Aug. 1	60.6	68.0	5	..	63.8 59.9	57.5	62.6	4	..	60.2 57.5	60.2	71.5	5	..	63.0 59.0	..	..
" 2	58.9	64.5	4	..	63.0 59.8	57.8	64.0	3	..	60.2 57.3	59.7	71.0	2	..	62.0 59.0	..	..
" 3	58.6	68.0	2	..	64.5 59.6	51.8	62.2	1	..	59.0 57.3	58.5	74.0	5	..	61.0 59.0	..	..
" 4	57.3	64.0	8	..	62.0 59.9	55.7	62.8	1	..	59.1 57.3	62.5	77.8	3	..	62.9 59.0	..	..
" 5	55.3	67.0	1	..	61.1 59.8	61.7	67.4	2	..	58.9 57.2	60.2	78.1	5	..	64.2 59.0	..	..
" 6	56.6	71.0	5	..	60.1 59.7	65.5	76.8	8	..	60.1 57.2	69.2	84.0	2	..	65.7 59.0	..	..
" 7	55.6	65.0	1	..	60.9 59.6	65.5	74.0	6	..	62.3 57.2	65.2	75.0	9	..	65.5 59.0	..	..
" 8	58.5	65.8	5	..	60.1 59.5	63.0	70.5	3	..	62.2 57.2	64.7	80.5	4	..	64.3 59.2	..	..
" 9	60.4	68.0	2	..	61.2 59.2	60.7	68.8	2	..	61.4 57.3	63.5	69.8	1	..	65.7 59.3	..	..
" 10	64.2	71.3	4	..	62.0 59.5	57.4	59.0	7	..	60.8 57.5	60.5	69.6	5	..	63.8 59.4	..	..
" 11	60.4	65.4	..	..	61.5 59.2	56.4	65.0	5	..	59.1 57.5	57.9	64.1	3	..	63.0 59.5	..	..
" 12	57.1	63.0	1	..	59.0 60.1	56.5	63.3	..	..	58.9 57.6	57.9	65.0	1	..	62.5 59.5	..	..

1885.

1886.

1887.

Date.	Mean Temp.		Deaths	Earth Temp.		Mean Temp.	Max. Temp.		Deaths	Earth Temp.		Mean Temp.	Max. Temp.		Deaths	Earth Temp.	
	1 ft.	4 ft.		1 ft.	4 ft.		1 ft.	4 ft.		1 ft.	4 ft.		1 ft.	4 ft.			
Aug. 13	54.3	61.0	..	58.2	59.1	61.0	68.4	..	59.3	57.5	55.0	57.4	..	61.0	59.4		
" 14	54.3	60.4	..	58.4	59.0	59.3	67.0	1	59.4	57.5	54.2	66.0	2	59.6	59.6		
" 15	56.1	71.1	1	58.8	58.8	61.0	70.2	..	60.2	57.5	59.0	68.0	3	59.2	59.2		
" 16	62.9	74.0	2	60.6	58.6	61.2	66.0	4	61.2	57.8	59.9	70.7	1	60.7	59.1		
" 17	61.4	71.3	2	61.2	58.8	58.4	62.4	4	60.7	57.5	56.7	63.2	1	57.7	59.0		
" 18	56.9	60.5	1	60.5	58.6	59.0	66.0	1	59.9	57.5	58.1	63.8	..	59.6	58.6		
" 19	51.1	57.0	..	58.0	58.6	61.4	67.2	2	60.7	57.5	57.0	60.4	2	58.1	58.8		
" 20	56.1	67.0	2	57.7	58.5	60.8	69.8	5	61.3	57.6	56.1	63.2	2	58.2	58.8		
" 21	54.4	64.8	1	57.7	58.6	60.3	70.5	3	60.9	57.8	58.2	69.0	..	59.2	58.7		
" 22	55.4	61.2	..	58.2	58.4	59.6	66.0	4	61.0	57.8	59.6	72.8	1	58.2	58.6		
" 23	55.3	62.0	2	58.7	58.5	58.2	66.5	1	60.7	57.8	61.5	75.0	2	60.0	58.3		
" 24	59.2	69.0	1	58.4	58.1	63.0	75.0	4	60.9	57.9	64.3	78.3	4	60.2	58.2		
" 25	61.6	72.5	3	59.2	58.0	60.8	67.0	2	61.7	57.9	66.3	81.3	2	60.3	58.2		
" 26	57.2	61.8	1	60.0	58.0	62.8	70.8	4	61.0	57.9	64.3	74.0	1	61.1	58.2		
" 27	50.3	55.1	..	58.0	58.0	65.3	72.0	4	61.4	58.0	63.5	72.7	1	61.8	58.2		
" 28	54.6	59.3	..	57.2	58.0	68.4	74.0	2	62.7	58.0	64.7	77.0	3	61.6	58.5		
" 29	54.4	60.0	1	57.5	58.0	63.4	74.0	1	62.2	58.0	63.2	71.0	1	62.3	58.5		
" 30	53.0	58.2	2	56.1	58.6	65.8	82.3	5	61.5	58.0	63.3	70.0	..	62.0	58.7		
" 31	57.2	55.8	2	56.2	57.8	66.8	80.8	3	62.9	58.1	54.0	65.8	..	60.9	58.8		
Sept. 1	55.1	63.0	..	56.3	57.4	66.0	72.0	5	63.9	58.2	57.6	77.0	1	59.2	58.8		
" 2	54.3	62.4	1	56.2	57.5	55.8	57.5	..	62.3	58.5	60.7	66.8	1	58.9	58.9		
" 3	61.3	68.5	..	57.2	57.2	57.8	62.5	1	60.3	58.8	60.3	68.7	1	58.0	58.8		
" 4	60.3	68.5	1	58.0	57.1	64.2	73.0	2	60.8	58.8	58.9	65.0	3	58.5	58.6		
" 5	59.8	68.0	..	58.2	57.1	64.3	58.8	3	61.6	58.5	57.8	67.0	1	58.2	58.5		
" 6	58.6	66.6	1	57.8	57.2	61.0	69.5	3	60.6	58.6	60.9	67.1	1	58.6	58.5		
" 7	58.8	65.4	..	58.1	57.1	58.3	66.8	3	60.5	58.5	53.7	58.6	2	57.9	58.2		
" 8	57.3	66.5	..	58.1	57.0	58.5	66.0	7	59.8	58.7	57.9	61.5	2	54.8	58.2		
" 9	55.9	62.2	..	58.0	57.1	62.8	70.6	6	60.0	58.6	57.8	65.8	1	57.0	58.0		
" 10	55.4	62.1	..	57.0	57.0	58.4	70.6	9	60.2	58.5	56.0	60.8	..	57.7	58.0		
" 11	53.1	60.0	..	56.4	57.0	55.7	66.6	3	57.9	58.5	54.3	59.8	..	57.0	57.8		
" 12	53.9	62.6	1	59.0	57.0	62.2	69.0	5	59.2	58.5	52.5	60.0	1	55.7	57.8		
" 13	57.5	64.0	1	56.6	56.8	66.0	73.0	2	60.7	58.5	49.7	54.4	..	55.3	57.7		
" 14	60.3	77.8	2	56.2	56.8	61.3	71.0	..	60.2	58.2	52.1	59.1	1	53.8	57.5		
" 15	64.8	73.0	..	58.2	56.9	54.9	61.0	3	60.1	58.2	53.7	58.0	1	54.9	57.2		
" 16	58.2	65.1	1	58.0	56.8	52.9	51.3	3	57.9	58.2	51.9	59.8	..	53.4	57.1		
" 17	56.6	66.2	1	57.5	56.8	56.8	65.0	1	57.9	58.1	55.2	63.2	1	54.8	57.0		
" 18	56.4	64.8	..	57.5	56.9	55.9	65.8	2	57.0	58.1	54.2	62.0	..	55.0	56.8		
" 19	55.1	63.5	..	56.6	56.9	53.2	64.0	1	56.5	58.2	53.9	63.0	..	54.4	56.7		
" 20	54.6	64.0	..	55.5	56.8	50.2	60.4	2	56.8	58.3	53.3	61.0	..	54.7	56.5		
" 21	56.8	62.5	..	57.0	56.8	55.3	58.2	3	56.0	57.9	52.9	56.8	1	55.2	56.4		
" 22	54.7	68.0	..	55.5	56.8	51.6	58.5	..	55.2	57.8	52.9	56.8	1	55.1	56.3		
" 23	56.3	58.0	1	56.6	56.6	47.9	53.0	1	54.3	57.6	53.4	59.8	..	54.5	56.3		
" 24	50.2	57.9	..	55.2	56.5	51.4	56.8	..	51.0	57.1	50.1	53.2	..	54.4	56.2		
" 25	45.5	51.0	..	53.8	56.5	51.9	58.0	1	54.3	57.1	49.8	62.6	..	56.5	56.2		
" 26	42.4	51.0	..	52.0	56.4	57.1	63.8	1	55.2	56.8	55.1	59.0	..	54.1	56.0		
" 27	43.1	48.0	..	50.8	56.2	55.9	53.6	2	55.0	56.8	50.7	58.0	..	53.0	55.9		
" 28	47.4	56.0	..	49.3	56.6	54.3	63.2	2	54.0	56.8	44.1	55.5	1	51.4	55.8		
" 29	53.6	60.8	..	52.0	55.7	61.7	69.2	2	56.2	56.4	41.1	55.5	..	49.3	55.6		
" 30	52.1	59.5	..	52.3	55.5	60.2	63.8	..	56.9	56.3	48.2	57.8	1	50.2	55.4		
Oct. 1	49.8	57.4	1	51.2	55.1	57.1	73.0	3	52.2	57.0	50.1	54.3	..	51.0	55.1		
" 2	50.9	57.0	..	51.0	55.0	55.9	63.5	1	55.0	56.8	51.8	58.0	..	51.4	54.8		
" 3	50.1	57.0	..	51.8	54.9	54.5	65.7	2	55.2	56.2	53.0	55.8	..	52.1	54.8		

1885.						1886.						1887.					
Date.	Mean Temp.	Max. Temp.	Deaths	Diarrhoea.	Earth Temp. 1 ft. 1 ft.	Mean Temp.	Max. Temp.	Deaths	Diarrhoea.	Earth Temp. 1 ft. 1 ft.	Mean Temp.	Max. Temp.	Deaths	Diarrhoea.	Earth Temp. 1 ft. 1 ft.	Mean Temp.	Max. Temp.
Oct. 4	48.1	56.7	..	50.3	54.6	64.1	75.0	..	56.3	57.0	53.5	58.5	..	52.1	44.7	..	..
" 5	47.1	54.1	..	50.8	54.4	64.1	74.0	2	58.0	56.2	48.0	54.3	..	51.1	54.5	..	..
" 6	46.2	55.5	..	49.0	54.4	55.5	58.2	1	58.5	56.5	49.8	52.2	..	51.6	54.3	..	..
" 7	46.9	56.3	..	49.7	54.0	55.6	62.7	..	56.8	56.6	52.5	57.6	..	51.5	54.2	..	..
" 8	46.9	56.3	..	48.6	54.0	58.4	63.7	1	57.2	56.5	50.5	53.5	..	52.0	54.1	..	..
" 9	46.5	53.0	..	48.6	53.8	53.5	58.5	..	56.7	56.6	45.1	47.0	..	51.2	54.0	..	..
" 10	44.6	53.0	..	48.5	53.5	52.0	58.0	..	55.6	56.2	46.3	49.5	..	50.3	54.0	..	..
" 11	45.2	49.8	..	48.8	53.0	49.4	57.2	1	56.3	56.6	44.2	48.0	1	47.4	54.0	..	..
" 12	40.8	50.3	..	47.0	53.0	54.8	59.0	..	54.1	56.6	37.8	47.1	1	46.6	53.8	..	..
" 13	42.0	46.5	..	46.8	53.0	50.4	55.3	..	53.8	56.2	40.4	47.2	..	45.0	53.5	..	..
" 14	44.3	49.5	..	46.9	52.7	48.5	53.2	..	51.8	56.0	43.2	49.5	1	44.8	53.0	..	..
" 15	49.1	55.8	..	47.8	52.5	53.8	57.2	1	52.4	56.0	42.0	49.8	..	43.5	52.8	..	..
" 16	52.1	61.3	..	49.0	52.0	47.2	50.0	3	52.3	55.7	40.4	51.0	..	43.5	52.5	..	..
" 17	45.3	51.0	..	49.0	52.0	47.7	51.4	1	52.2	55.0	40.6	57.0	..	43.8	52.2	..	..
" 18	46.3	51.0	..	48.8	52.0	49.2	52.0	1	52.3	55.0	42.6	48.3	..	44.2	51.8	..	..
" 19	43.2	46.5	..	48.5	52.0	51.2	53.3	..	52.4	55.0	46.5	52.8	..	45.6	51.5	..	..
" 20	43.0	46.8	..	47.7	52.0	50.0	56.8	..	51.7	55.0	47.6	54.5	..	45.6	51.3	..	..
" 21	43.1	48.0	..	47.3	51.9	48.9	51.8	..	51.9	54.8	36.5	51.6	1	44.3	51.5	..	..
" 22	43.0	47.0	..	47.6	51.8	45.4	55.7	1	50.7	54.6	27.8	49.2	..	42.5	51.2	..	..
" 23	43.6	46.0	..	47.2	51.6	49.0	55.6	..	49.8	54.5	41.8	52.4	..	44.5	50.8	..	..
" 24	43.3	45.3	..	46.7	51.4	48.5	53.6	..	50.2	54.2	40.0	43.5	..	45.0	50.6	..	..
" 25	43.3	53.8	..	45.0	51.3	48.1	50.7	..	50.0	54.0	38.0	43.5	..	41.8	50.4	..	..
" 26	49.1	55.5	..	46.4	51.0	46.4	46.9	..	50.0	54.0	36.3	47.2	..	40.0	50.2	..	..
" 27	44.1	46.4	..	45.9	51.0	46.3	50.2	..	49.0	53.7	44.5	51.0	..	42.5	50.0	..	..
" 28	41.3	46.5	..	48.8	50.8	49.6	53.8	1	49.4	53.5	51.0	56.4	..	45.4	49.7	..	..
" 29	44.4	50.4	..	43.8	50.6	54.0	61.0	..	50.5	53.3	49.0	53.0	..	44.6	49.5	..	..
" 30	37.9	45.6	..	42.5	50.3	55.0	57.1	..	52.2	53.2	44.3	50.4	..	44.6	49.5	..	..
" 31	41.6	44.5	..	44.0	50.1	55.8	59.0	..	52.7	53.0	42.2	49.0	..	43.0	49.2	..	..

Taking a broad view of the above records, to my mind the conclusion to be drawn from a consideration of them is, that soon after the temperature of the earth, at a depth of one foot, has reached 59° to 62° F., the causes producing the disease begin to operate. We do not, it is true, find the same exact coincidence in the decline of the disease with the fall of the earth temperature, for a few deaths are recorded when that has fallen to 54°, or even lower; but I think this is easily explained by the fact that some cases will run a more prolonged course than others, and may not prove fatal until some time has elapsed from the first onset of the attack.

Or, again, it is quite easy and logical to suppose, that the causes having once been set in operation, should persist for some little time after the conditions which resulted in their production have ceased to exist.

It may be noted here that during the months of July, August, and September, I have had the temperature within the sewers taken daily, in six different parts of the town. As might be expected, where the ventilation of

these was most free, the temperature within them was approximately in accord with that of the external air; but the maximum temperature registered was always something below, whilst the *minimum temperature was usually above that of the external air*, so that the mean temperature for the twenty-four hours was higher.

The minimum temperature in any of these did not fall to 53° F. until after the end of September, and was until that time more often nearer to 60° F.

It is notorious that, in all the low-lying districts of the town, the present sewers are more or less foul, with gradually accumulating deposits from their contents. This offensive material, acted upon by a temperature of 60° and upwards, furnishes all that is required for an active development of microbic life.

Actual examination of the sewer air shewed that, in the worst parts, these microbes were largely in excess compared with the external air.

We have long known that different species of microbes, or bacteria, have different temperatures at which they best grow and develop, and that the germinal vitality of them and their spores, is very dependent upon the temperature by which they are surrounded, being much reduced and held in abeyance by cold, but ready at once to take on renewed vitality when again subjected to the influence of warmth.

Sternberg (*International Journal of Medical Sciences*, July, 1887,) gives the result of some experiments undertaken to ascertain the temperature at which different pathogenic organisms were absolutely killed and destroyed. The thermal death-point, as stated by him and others, varied much for different species: thus the *Sporillum Cholere Asiaticae* was killed at 52° centigrade, the *Spirillum Finkler-Prior* at 50° C., the *Streptococcus Erysipelatus* at 54° C., and the *Vaccine virus* at the same temperature; whilst the virus of *Hydrophobia* required a temperature of 60° C., the *Staphylococcus Pyogenes Albus* 62° C., *Sarcinia Lutea* 64° C., and the *Anthrax bacillus*, *with its spores*, was not destroyed at a less temperature than 100° C.

These and other facts prove that with microbes, as with organisms of larger growth, whether vegetable or animal, certain temperatures are most favourable for their development and life.

I have attempted, in this and former reports, to show that the air of the town, in certain districts, contains more germs than in others, and that in these same districts *Diarrhoea* prevails most. I have pointed to a condition of things whereby, for many years past, a pollution of the soil, &c., in these districts especially, has been going on. Given, therefore, this polluted condition of much of the area upon which the town is built, we have, under the

influence of the sun's rays, in the heat of summer, sufficient cause for the production of enormous numbers of micro-organisms and their germs. My own experiments demonstrate that the most favourable temperature for the artificial cultivation of these aerial organisms is somewhere between 60° and 65° Fahrenheit, and I have some evidence to shew that these artificially-cultivated microbes have the power to produce Diarrhoea in any person swallowing them.

Without doubt another contributing factor, and possibly a more important one than it has usually been considered, is the geographical position of the town: lying, as all the older part of it does, low down in the valley of the Soar, the direction of the valley, too, being such that the prevailing winds do not sweep along it but rather across it, so that in the summer months what little breezes may be blowing affect but slightly this part of the town, which lies baking in the heat of the summer sun: its old and narrow streets, and many of its newer ones also, with their long lengths of unbroken rows of cottage property, having scarcely a breath of fresh air to be felt in them; all these conditions, instead of helping to mitigate the effects of a polluted atmosphere, are powerful aids to and accelerators of the evils induced thereby.

To summarize, I would submit that—

- (a) In the earliest mortality statistics of Leicester, we find no marked excess of deaths in the third quarter of the year, such as we find since 1850.
- (b) We may therefore conclude that Diarrhoea did not formerly produce the mortality it does now, and presumably, therefore, did not prevail so extensively as now, during the summer season.
- (c) There is ample evidence of a continued pollution going on since that time, producing a condition of soil, &c., eminently favourable to the development of bacterial forms of life.
- (d) That the disease appears annually when the earth temperature has reached a certain point, and declines as this declines.
- (e) That, in those districts of the Borough where Diarrhoea is most prevalent, the air is most contaminated with microbes or their germs and spores.
- (f) That these same microbes, when artificially cultivated, possess the power of inducing Diarrhoea in the human subject.
- (g) That the results are all intensified by the local position, &c., of the town.

Whether the geological formation of the district has any special significance in this enquiry, I cannot say. This is a point which can only be elucidated satisfactorily by a more comprehensive enquiry, extending through the country at large, and comparing towns where Diarrhoea prevails with other towns where it is but little prevalent. It is thus that much useful information may be looked for from the report, which was stated in the House of Commons will soon be forthcoming, as the result of the prolonged and extended investigation, going on now for some years, not merely at Leicester, but in numerous other places, by Dis. Ballard and Power, of the Local Government Board.

It is only by such an extended investigation that many of the points enlarged upon in this report, as being probable causes of the undue prevalence of the disease in Leicester, can be confirmed or confuted.

In the meantime the practical point that concern us is, what can be done to diminish it, and what are the prospects of its reduction in the future.

I am inclined to take a somewhat hopeful view. If what I have laid before you in this report be based upon fact, we may fairly hope that as improved sanitation, or in plain English, more cleanliness, cleaner sewers, cleaner soil (for the soil has a natural tendency to purify itself if allowed a fair chance), a cleaner river, absence of flooding and polluted house basements, together with cleaner houses and habits of the people, and extended education among the poorer classes, yearly make headway, the evils inseparably attached to the low lying position of the town may be to some extent combated and neutralized, instead of, as in the past, increased tenfold, and that thus the annual scourge of this otherwise healthy borough may be very considerably abated.

I am, Gentlemen,

Your obedient servant,

H. Y. TOMKINS.

Epizootic Disease.—Diseases of the lower animals, from which man himself may become affected, have not existed to any great extent. A few cases of Swine Fever, which were brought to the notice of your Medical Officer of Health by the Veterinary Inspector, deserve a passing notice as shewing how easily diseased meat may be brought into the market, so long as private slaughter-houses are permitted to exist within the Borough.

Swine Fever.—Early in May five pigs were discovered suffering from this disease. It required no skilled eye to see at

once that the animals were very ill, one apparently dying. Under the supervision of the Veterinary Inspector for the Borough, the animals were removed to the public abattoir, and as an experiment there slaughtered and properly dressed, as if for food. The carcase of the one which had been most ill it would probably have been impossible to sell as meat, the diseased condition was so evident, but it might easily have been used for pies, sausages, or the like; but the remaining four, after the inguinal glands, the kidneys, and the lungs, *i.e.*, the parts in which effects of the disease was most apparent, had been removed, might with the utmost impunity have been sold in the public market, and an Inspector, however expert, have fairly been excused for failing to detect that the animals had been diseased prior to slaughtering. Such animals could not have been brought to a public slaughter-house during life, without at once being detected as unfit for human food.

Easy to dispose
of diseased
animals as meat

Anthrax.—In April, a carcase of meat was found by Inspector Coles, in a cart at the Cattle Market, under suspicious circumstances. The attention of the Veterinary Inspector was directed to it, and the owner admitted that the beast had been ill with some disease before being killed, but asserted that it was not intended for human food—only for the feeding of dogs. Examination of some of the tissues and muscles by your Officer of Health, together with artificial cultivation of the bacilli found therein, proved that the animal had been suffering from Anthrax before death. Fortunately, during the year, no case of this disease has been met with in the human subject.

Seizure of
suspicious meat
at market.

Rabies.—Towards the middle of the summer, and accompanying the onset of the hot weather, complaints were received of the number of stray dogs about the town, and several persons were reported to have been bitten by them. It was further rumoured that some of these were mad; but, happily, no case of hydrophobia arose from any of them. One gentleman, who was somewhat badly bitten in the leg, took the precaution of going at once to Paris, to consult M. Pasteur; but there was no real

evidence that the dog was rabid. A police constable, a member of the Borough force, was also badly bitten on the arm by another stray dog; and one or two other persons having also been bitten about the same time, the Sanitary Committee issued public notices that dogs were to be under proper control, and all animals found at large, and not under such control, would be seized and destroyed, unless promptly claimed. In this way 182 were taken possession of by the police, of which 53 were destroyed, and the remainder either sold or reclaimed by their owners. As much ignorance is often displayed regarding this disease, and as death from hydrophobia is one of the most terrible a human being can suffer, a brief description of the symptoms met with in a dog suffering from rabies may not be out of place.

Precautions
against
Hydrophobia.

“Change of habits, restlessness, moving from place to place, often hiding in dark secluded corners, depraved appetite, gnawing and eating indigestible substances, altered voice, difficulty in swallowing, but showing no dread of water; thick viscid saliva, hanging from the corners of the mouth, which the dog tries to remove with his paws; frequently snapping at the air or imaginary objects. These symptoms, in the furious form of the disease, are followed by paroxysms of excitement, in which there is an irresistible tendency to bite and attack other animals, especially dogs. The animal then wanders from his home, biting and snapping at every animal that may come in his way. Emaciation and exhaustion rapidly follow, with loss of nerve power, partial paralysis often supervenes, and the animal drops and dies, if it has not previously been destroyed. In the dumb or torpid form of the disease, the premonitory symptoms are followed by dropping or paralysis of the lower jaw, rendering the animal unable to bark or bite; the tongue, swollen and livid, hangs out of the mouth. The dog in this condition seldom leaves his home, but endeavours to remain quiet in some dark place, takes little or no notice of what goes on around it, paralysis of the hind limbs soon sets in, and death quickly follows.”

Symptoms of
Rabies
in dogs.

Commencement
of New Drainage
Scheme for
Borough.

Sewers of the Borough.—The new drainage scheme, devised by Mr. Gordon, the Borough Surveyor, and referred to in last year's report, has made some considerable progress, that part known as Section 4 being completed. This consists of 4765 yards of foul and storm overflow sewers, comprising some of the largest main trunks that will have to be constructed, and extends from the Lero to Belgrave-road, thence along Palmerston-street, Stanley-street, Brunswick-street, Humberstone-road, Nichols-street, Midland-street, St. George-street, Northampton-street, and Granby-street, to East-street.

In addition to those sewers which are essentially part of the new drainage scheme, a large number of others have been constructed in public and private streets during the past year, the total reaching no less than 13,093 yards, or upwards of seven miles.

Sewer Cleansing
and Ventilation
in 1887.

The opening up and cleansing of the old branch sewers has also been steadily continued, and all these have been provided with inspection shafts, the length during the year thus cleansed in various parts of the town, being 1782 yards: the number of shafts brought up to the road level from these is 216. The following figures briefly summarize the work which has been carried on by the Surveyor, in connection with the sewers of the Borough, since 1881:—

Sewer Construction and Cleansing, &c., since 1881.

	Length in yards of New Foul Sewers constructed.	Length in yards of New Storm Sewers constructed.	Length (in yards) of Old Sewers opened up, clean- sed, & provided with inspection shafts.
From 1881 to			
end of 1886	11899	22504	20441
During 1887	8792	4301	1782
Total ..	20691	26805	31223

An important feature connected with the working of the new system of sewers, when they shall be completed, is the fact that the Surveyor has great hope of the smaller subsidiary sewers

becoming much cleaner, and more free from deposit, than can possibly be the case at present; as, whenever a heavy rainfall occurs, these will not become blocked by the backing up of the main trunks into which they discharge, but will, to a large extent, be washed and flushed by the unimpeded flow of the water along them. The main trunks will be provided with special flushing arrangements.

Sewers to be
cleaner
in future.

The objectionable practice, and one highly to be condemned, of turning very hot water into the sewers of the town, still goes on as before. This subject was alluded to in last year's report. In any system of sewers this ought to be prohibited; and as the practice will probably continue until compulsory powers exist for its prevention, it would be well if Leicester, following the example of some other towns, would obtain such powers.

Hot water in
Sewers.

Probably few sanitary questions, at the present time, are the subject of such contrary opinions and practices as that of sewer ventilation, and a veritable "battle of the sewers" is being fought over it. In Leicester it has come prominently to the front during the year just ended, and at its meeting in October last, a large part of the time of the Council was taken up in debating the various aspects of this difficult problem. A few years ago, the sewers of the Borough were without any systematic ventilation, or even vent, and the Borough Surveyor, in carrying out the cleansing of the old sewers and the construction of new ones, has steadily pursued the plan of bringing up inspection shafts to the road level, to the number at the present time of about 1069, of which 729 are open and 340 closed. In addition to this, the owners of some fifty large chimney shafts have permitted a connection to be made from the sewers to these, and there have also been erected about 150 special ventilating shafts up the sides of houses. Since this has been done, however, numerous and loud complaints have been made, in many parts of the town, of the offensive smells said to be emitted from the openings in the road, which at times act as outlets instead of inlets for air. The principle which has guided

Ventilation of
sewers.

Complaints of
open road
ventilators.

Difficulties
attending sewer
ventilation.

engineers in adopting this system is undoubtedly a sound one. They say, that by passing a sufficient quantity of fresh air through the sewers, you dilute and rapidly remove the air contained within them, and in this way minimize whatever deleterious properties it may possess; and that, whether we are dealing with an underground passage like a sewer, a cellar basement, or a dwelling-room, the more fresh air and oxygen we can get through them the better for the purity of their various atmospheres. But they go further, and say that by providing a sufficient number of special shafts, carried above the house-tops, these ground openings are, or should be, converted mainly into inlets. Unfortunately, however, the ways of air currents are subject to such apparent vagaries, that this certainly does not always happen, and, whether for good or evil, the ground openings are undoubtedly at times outlets for the air within. On a cold day this is often apparent to the sight, when vapour may be seen ascending from the grids, and constantly so in those neighbourhoods where hot water is turned into the sewers. Actual experiment will also demonstrate the same fact.

Are we then, to box up our sewers, and attempt to batten down the contained air, like a fire in a ship's hold. It is impossible, and will only end in disastrous failure, for under such circumstances the confined air will soon exert pressure sufficient to pass any trap yet devised, and escape either within our houses or at traps and gullies closely adjoining thereto. If vent be not found for it at *proper places, it will find vent for itself at improper ones*. The above remarks apply to any system of sewers, no matter how perfect they may be; but when we have to deal with such an imperfect set as yet exists in Leicester, they are still more to be emphasized. Many of these underground channels are in this town little better than underground cesspools, along which is a sluggish flow constantly becoming more or less filled with deposits of the foulest character, and which must, perforce, give off odours of an offensive character. Where these conditions exist in a sewer passing along a comparatively narrow street, inhabited by a densely crowded population, it is, to quote from

Need of
modification in
narrow streets,
&c.

last year's health report, a most "undesirable thing to give vent to these in the middle of a street, at the road level." The wider thoroughfares and the most open spaces should be used for these openings, so that, when they do act as outlets, the emitted air may be at once diluted in the atmosphere, with the least possible chance of being breathed in an undiluted state; and in the close narrow streets alluded to the surface grids should be closed, and their place taken by shafts or special sewer ventilators, such as those described below. It goes without saying that the more in number the shafts carried above the houses are, the less risk will there be of intra-sewer pressure and emission of gases at undesirable points.

Many and various have been the attempts to deal with this question in a practical manner, but hitherto attended by only partial success. There is ample room for the inventive genius of engineers and others to display itself here.

Two inventions have been the subject of experiment in Leicester during the past few months: one, known as "Keeling's Sewer Gas Destructor," is an attempt to artificially draw out the foul air from the drains, and by passing it through a kind of gas furnace, to destroy all its noxious properties, and render it harmless.

Artificial system
of ventilation,
&c.

It consists of an upright hollow column, like a lamp-post (Fig. 1), which may have either a lamp or cowl affixed to the top. This column is six inches in diameter, and contains in its base (Fig. II.) the destructor or cremator, which consists practically of a powerful bunsen gas burner. Leading into this base from below is a direct communication with the sewer. Above the burner are a series of iron cones, which, when the gas is burning, become intensely heated, and thus the sewer air which is drawn up by the action of the flame, and through these highly-heated iron cones, is very efficiently burned or cremated, the temperature here being sufficient to melt lead, and must therefore exceed considerably 600 deg. F.

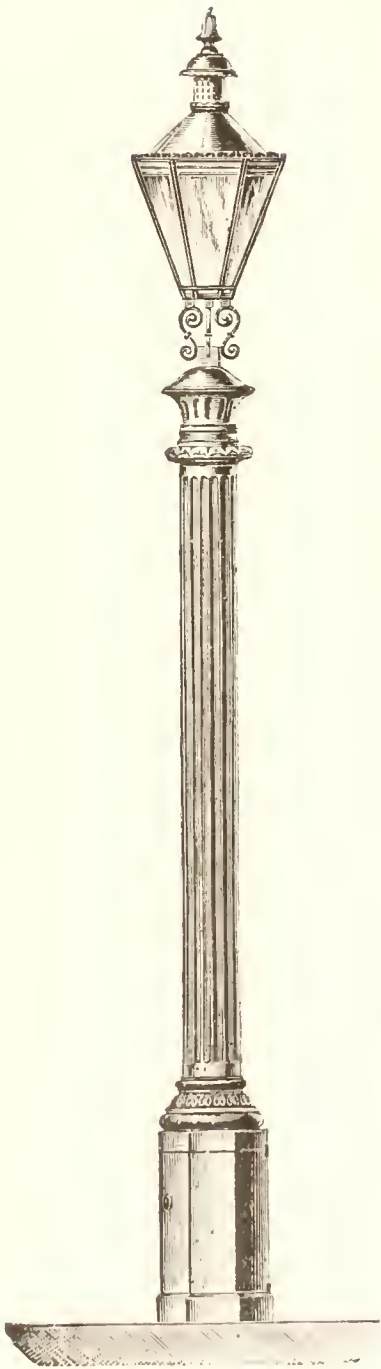


Fig. I.

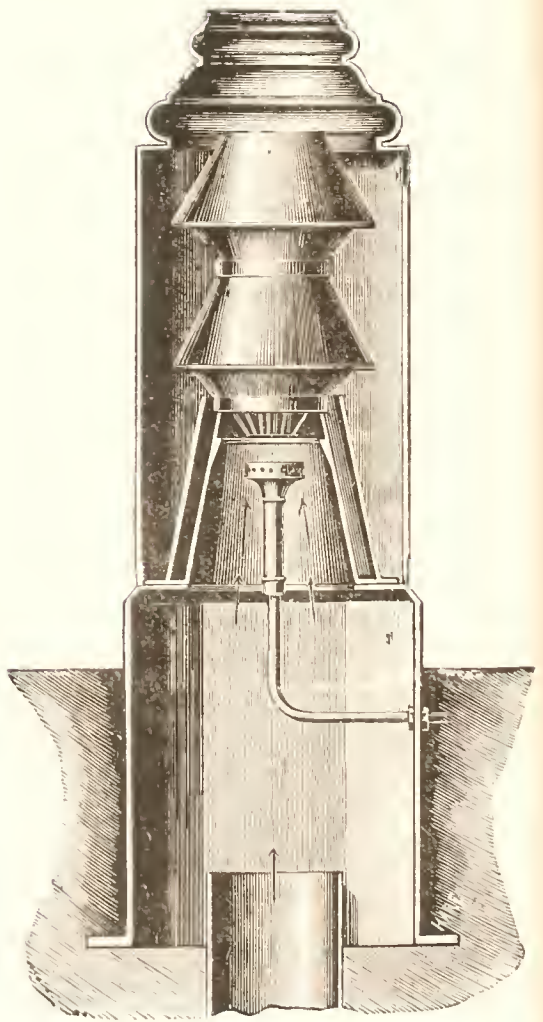


Fig. II.

Some experiments made by your Officer of Health upon the working of this apparatus, with special reference to the destruction of microbic forms of life, gave the following results:—Samples of air were subjected to observation, and experiment made in the usual manner with Hesse's apparatus and nutrient sterilized gelatine. Samples of air were taken—1st, from the sewer connected to the base of the destructor; 2nd, from the top of the shaft, after having been passed through the destructor. The destructor experimented upon was that situated in Humberstone-gate: the consumption of the gas in the burner at the time was about seven and a half cubic feet per hour. The temperature of the sewer air, taken two feet below the surface of the ground, was 54 deg. F., and yielded thirteen growths of micro-organisms per litre (including in this term both moulds and bacteria). The air at the top of the shaft, that is, the cremated sewer air, was found to have a temperature of 150 deg. F., taken two feet from the top of the shaft, and yielded only two growths, one a mould, the other one of the common micro-organisms.

Results of
"Keeling's
Destructor.

But another fact in connection herewith is of considerable importance, in estimating the value of this invention: the sewer air, as it was being drawn up from the sewer, had a foul, offensive odour. No chemical examination was made of its constituent parts, but the presence of sulphuretted hydrogen, or its allies, was palpable to the nose. After passing through the destructor it was, as it issued from the top of the shaft, practically free from offence. So that it may fairly be stated that the action of this cremating process is to render an offensive air odourless, and to a great extent, if not entirely, to destroy the germs of bacterial life contained in it.

The velocity of the current of air passing through the shaft was about 46 cubic feet per minute, which would give 2760 cubic feet per hour, or 66,240 cubic feet extracted in the twenty-four hours, a far more effectual ventilation than can be got by any known natural system of ventilation. The practical obstacle

to the extensive use of these lies, of course, in the expense attending them, for the consumption of gas. Powerful as the extractive force of this apparatus is, it does not reach that obtained by a tall factory chimney, which often extracts from twice to ten times as much air in the same time.

Another invention, somewhat similar in principle, but in which an endeavour is made to utilize the ordinary gas burner of the lamp, and thus incur no increased expense for gas, has been brought before the notice of the Sanitary Committee by Dr. Paulson, of Mountsorrel, and two of these have been erected in the town. As in the foregoing invention, a connection is made at the base of the lamp-post with the sewer, but the hollow column forming the lamp-post is continued in thinner material up through the body of the lamp (see Fig. 3), the extremity at the top of the lamp being expanded and containing lumps of charcoal. When the gas jets are alight they heat this expanded top, and to some extent the hollow column running through the lamp, and thus cause an upward current in the shaft from the sewer. It is thought that the air thus extracted may be purified to some extent, partly by the heat, but more so by passing through the charcoal, *dry* charcoal being well known as a powerful absorbent of many noxious effluvia; and the dryness of the charcoal, upon which its efficiency depends, is ensured by the nightly burning of the gas beneath it.

When the gas is not burning, merely natural forces come into play in creating an upward current.

From a series of experiments made upon this lamp, it was ascertained that when the gas was alight the velocity in the shaft varied from six to eighteen cubic feet per minute, whilst the air issuing from the top had a temperature of from 70 deg. to 90 deg. F. It ought, however, to be stated that this invention is but in an experimental stage, and Mr. Paulson hopes, by some alteration of detail in construction, to secure better results than this, without increasing the cost for gas.

Attempt to use
ordinary gas
lamps as
ventilators.

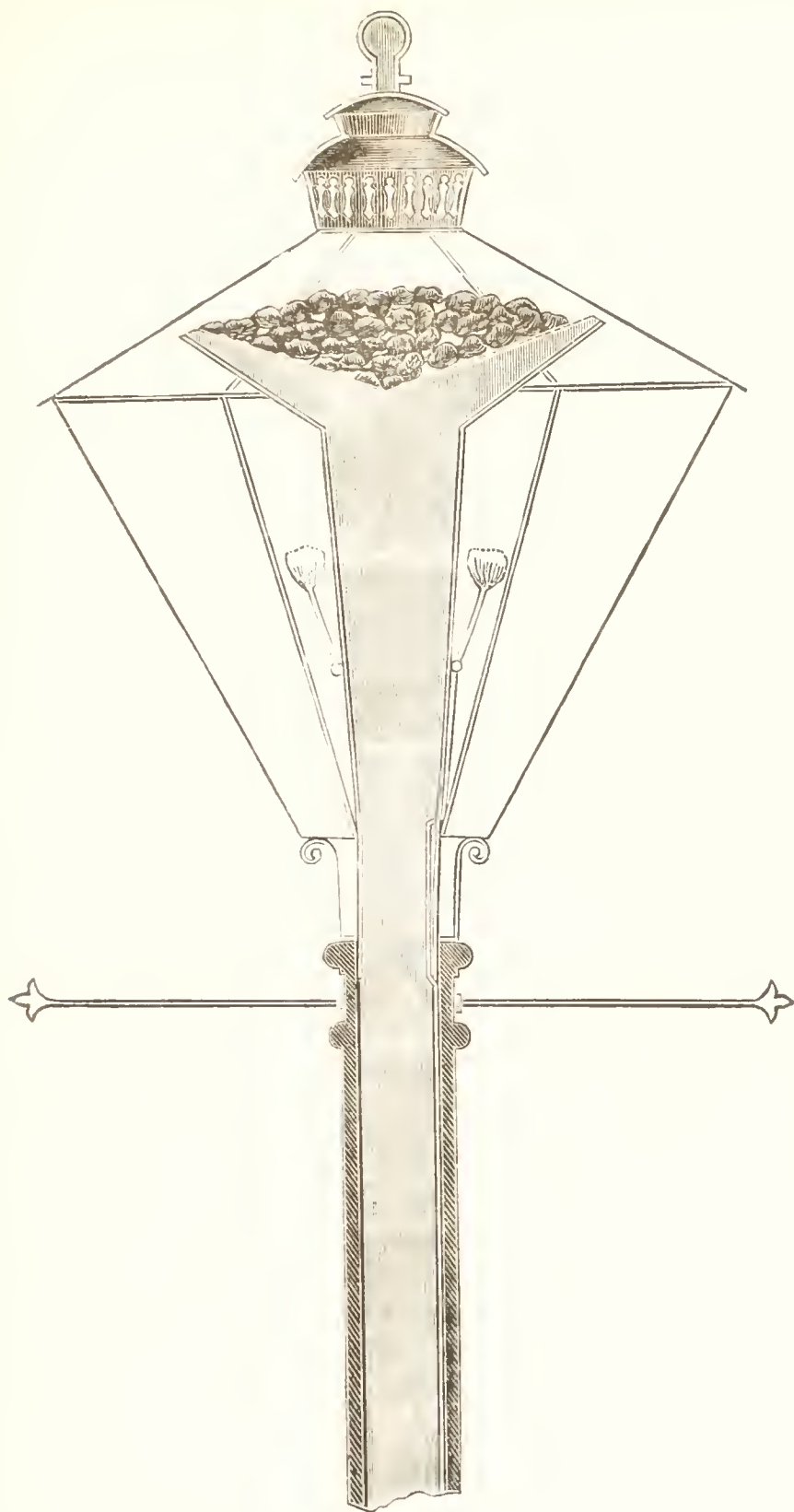


Fig. III.

In both of these inventions, an objection to their extended use, in the ordinary position of lamp-posts along the causeway, is met with in the fact that they would be discharging the aerial contents of the sewer at a level with the first-floor windows of houses, and only a few feet distant therefrom, so that their use would have to be largely confined to open spaces, or the centre of wide thoroughfares.

But, after all, these various attempts to deal with the foul air of sewers is but treating, as it were, *symptoms* of a disease, and *not the disease itself*. A properly constructed sewer, with adequate fall, sufficient flushing, and a good flow, should be comparatively clean and free from deposit: where this is the case, but little nuisance or harm will come, or complaints be heard of foul smells arising therefrom; and when the new drainage scheme of the town, now being carried out, shall have been completed, complaints such as have lately been received will, one may fairly hope, become a thing of the past.

Before leaving this subject of sewers, allusion may be made to some complaints which have been received, on and off, throughout the year, in the neighbourhood of New Bridge-street and Hazel-street, of offensive smells, which were suspected to come from the comparatively new sewer running along the former street, but which were said not to have existed until after the time when the new Gas Works at Aylestone were connected therewith. It was also asserted by some who had a knowledge of chemistry, that at times the smell was unmistakeably that of sulphuretted hydrogen. It appears to have been of a very evanescent and transient character, for, although much time has been spent and many visits made by several members of the staff of the health department, it could not, by them, be satisfactorily found or traced. Early in the year, the Officer of Health had inserted along the sewer strips of wood, chemically prepared, for testing the presence or otherwise of the offensive gas known as sulphuretted hydrogen; and at the same time, for comparison, similar slips were placed in the sewers in various other

Need of
cleanliness
of sewers.

complaints in
neighbourhood
Gas Works.

parts of the town, with the result that no trace of this substance was found in the sewer complained of. It was present to a slight extent at the junction of the Gas Works with the sewer in Aylestone-road ; also in Willow-street, Cobden-street, and Great Holme-street ; whilst in Sanvey-gate, Church-gate, Dun's-lane, and Russell-square, considerable quantities of it were proved to be present. Since that time further investigation has been made respecting the character of the liquids turned into the sewer from the Gas Works : some of these were found to contain a considerable quantity of free lime, others sulphuric acid, and others traces of carbohic acid, all of which should be helpful in disinfecting the contents of a sewer rather than to cause a nuisance. There was, however, one effluent which had a marked odour of a "gassy" character, much increased by warmth, and which at times is said by the workman engaged in looking after the interior of this sewer to be very strong, and even to make his clothing smell of the same. Possibly this may have had something to do with the complaint mentioned above, but more probably it is due to an occasional wafting from the Gas Works of those odours which are inseparable from the manufacture of this necessary but ill-smelling article.

Cremation.—Throughout the country at large, and particularly in our large centres of population, the question of disposal of the dead has of late attracted considerable attention, and it is certain that in the near future the question must come still more to the front. In all our largest towns the rapid increase of population necessitates the provision for the burial of bodies in numbers such as has never before been required. During the past year the subject has come under discussion in the Town Council. At the instance of the Leicester branch of the Cremation Society, Mr. Councillor Wright (the present Mayor) presented a petition to the Council, asking the Corporation to assist in providing facilities for the carrying out of cremation, when such is desired. Detailed plans, for the erection and construction of a crematorium, were also drawn and got out by the Borough

Cremation
discussion in
Council.

Surveyor ; and although a resolution to erect such a structure was ultimately rejected by the Council, the whole discussion, together with the number of those who voted in favour of the resolution, shewed that at some not far distant date the matter must again come up for consideration.

Undoubtedly, when properly carried out, that is to say, in a soil of a proper character, at a proper depth, and in a proper situation, with coffins that early decay and allow the earth to come into close contact and do its work, and when all precautions are taken to prevent water contamination, &c., then, earth burial fulfils all necessary requirements, and the body is within a moderate space of time resolved into its ultimate elements. Far different to this, however, is the actual condition of things so often existing in our large towns and cities. Enormous numbers are buried in a too limited area, often much too near the surface of the earth, and the soil is in many instances the worst that could be chosen for the purpose. In our own town it is notorious to all that the sub-soil is a heavy, stiff clay, which is constantly water-logged. The Cemetery is situated truly somewhat outside the populous part of the Borough, and is thus less likely to cause harm from emanations and water contamination ; but it is as unfitted as well can be to promote a rapid resolution of the organic matter deposited there ; to say nothing of the fact that before many years have passed away it will be getting all used up. From a sanitary point of view (and this is not the place to discuss other aspects of the question), cremation offers a ready and absolutely perfect remedy to all the above objections, and it is somewhat singular that England, usually in the van of sanitary progress, should, in an important matter like this, be far behind many continental countries.

Open Spaces and Recreation Grounds.—The new Spinney Hill Park, on the south-east side of the town, the opening of which was recorded in last year's report, has proved an acceptable recreation ground for all the dwellers of that district, and during last summer was resorted to by many thou-

Danger of
present system
of earth burial.

sands weekly. A handsome gift, in the shape of a drinking fountain, was erected by Mr. Councillor Mather, and much planting of shrubs and laying out of walks, &c., has been going on, while a gymnasium for children has also been provided. The Sanitary Committee have wisely decided to keep this ground as a park in the fullest meaning of the word, with liberty for all to wander over any part; and have not attempted to make a garden of it, or ornamental lawn, dotted over with irritating notices to "please keep off the grass." Steps are now being taken for the erection of a refreshment pavilion, designed in a picturesque style, in keeping with the surroundings.

Presentation
of drinking
fountain.

When the flood works, now in operation, shall have been completed, a considerable area of ground at the west end of the town will be at the disposal of the Corporation, from which a recreation ground may well be formed for the inhabitants of that district.

The importance of such open spaces as these to the well-being and health, moral as well as physical, of every crowded community, cannot be over-estimated. They are the one and only true corrective to the ill effects inseparable from a dense aggregation of human beings upon a limited area, and yet they are well nigh impossible to obtain in the older parts of any great town. In Leicester, what a boon a small space, of only half an acre in extent, would be in the neighbourhood of Wharf-street and Bedford-street, or in that of St. Nicholas Church, which could be devoted to the free use of the dwellers there as a playground for the children, and an open square where their elders might sit or walk at the close of their day's work, and which would serve as lungs or breathing spaces to these crowded localities. Even yet we are hardly alive to the necessities of the case, but allow whole districts to spring up, and become covered on every available square yard with bricks and mortar, and long streets of cottage property, with nothing to relieve the depressing monotony of their dreary uniformity. Take the district around the Great Northern Station, or that on the Highfields, both

Great need for
open spaces in
large towns.

Certain
proportion of
land should be
left unbuilt on.

covered with comparatively new houses, well built and arranged certainly, in comparison with those of years gone by, but sadly lacking such spaces as those now referred to. Or again, the West Cotes estate, and that which belonged to the late Mr. Harrison, on the Fosse-road, may be cited as still later instances of large open areas which are rapidly disappearing before the onward march of the builder. *Is it too much to ask, that in such new districts as these a certain proportion of land should be obtained by the Health Authority, say only half an acre in every twenty acres,* to be utilized for the above purposes, which, if converted into a square or play-ground, would in years to come, when the borders of the town shall have still further extended, become of untold benefit to the inhabitants there. Our American cousins have learned this lesson, and in most of their new towns make ample provision for parks, squares, and open spaces, which, in addition to the purposes they serve in a hygienic sense, lend themselves in no small degree to the beautifying and ornamenting the streets by which they are surrounded.

One small piece of legislation during the past session bore upon this subject. The "Open Spaces Act" (50 and 51 Vict., c. 32), extends the provisions of the "Metropolitan Open Spaces Act" to all health authorities throughout England, Wales, and Ireland.

Amongst other things, it empowers corporate bodies to make *free* gifts of land, to be used as open spaces, and contains clauses relating to the conversion of church-yards and burial-grounds into such open spaces.

Public Baths.—Public Baths are now an acknowledged necessity in all large towns, and it is satisfactory to be able to record the continued success of those in our own Borough.

Success of
Public Baths.

During the past year, 48,144 persons paid for admission to the Penny Swimming Bath, and 14,669 were admitted to the first-class ditto, whilst 15,078 used the Slipper and Shower Baths. A total of £890 was received, which more than sufficed to cover

all working expenses. At the Open-air Bathing Stations, at the Pasture and at St. Mary's, which are practically free, the expenditure exceeded the receipts by £33.

An extension has been made during the past twelve months, in the shape of a new Swimming Bath for Women, whereby the necessity of appropriating the Men's first-class Baths one day in the week, for the use of women, has been avoided.

It is satisfactory to be able to report, also, that the Sanitary Committee are at the present time taking the preliminary steps for providing additional Public Baths, in the neighbourhood of Humberstone-gate, the success of those situate in Bath-lane being such as to warrant them in doing so, whilst the need for them in this locality is undisputed.

Proposed
additional
Baths.

Houses unfit for Human Habitation.—No house during 1887 has been officially closed, on the ground of being so detrimental to health as to render it unfit for use as a dwelling-house, but many owners have complied with orders for repairing and improving properties which would otherwise have thus been closed. From this it is not to be inferred that all cottage property, and especially the very smallest of the sort, is satisfactory, or even within a reasonable distance of what any true sanitarian would wish for. Cellar dwellings in the Borough there are none, but two-roomed cottages, without any means of through ventilation, and the cubic capacity of which is often barely sufficient for the healthy existence of one human being, much less a family, are to be met with in large numbers in our courts and alleys.

Unhealthy
cottage
property.

The inherent difficulties in obtaining a proper supply of fresh air, inseparably connected with houses having openings or windows on one side only of the building, combined with their inadequate cubic space and the want of cleanliness on the part of many of their inmates, give rise to that peculiar stuffy, "frowsy," sickening odour, so well known to those who are in the habit of paying a visit to these dwellings, especially when a

case of sickness is in the house. It has long been understood that the unhealthy condition of such dwellings is due to the organic emanations given off from the lungs, skin, &c., and not to the mere abstraction of oxygen from, or addition of carbonic acid to, the respired air. Small as may be the amount of this organic matter given off from human bodies, yet, unless speedily removed by proper ventilation, it soon becomes harmful to a high degree, and small wonder need be expressed that those who breathe such an atmosphere, for many hours out of the twenty-four, should be sickly and debilitated. Within the last few months, M. Brown-Sequard has communicated to the French Academy of Sciences the results of experiments undertaken with a view to obtain more exact knowledge respecting the organic matter of the breath. He finds that in the breath of the most healthy persons there is a toxic principle which, when concentrated, possesses exceedingly virulent properties, and that in ill-ventilated rooms this constitutes a far more serious impurity than the increased amount of carbonic acid which is always found here. Young children and infants form a most delicate test as to the healthiness or otherwise of any particular district, and that little children need not die at the rate they do amongst the working classes of our large towns, of which Leicester stands amongst the worst, is shewn by the fact that in the Peabody Buildings, and other dwellings of that description erected in London, and where the density per acre of the population is very high, the death rate amongst the children is far below that of the populations surrounding them.

Within the last few weeks, the subject of Unhealthy Dwellings has been under discussion in the Town Council, having been introduced by Mr. Councillor Richardson, and a special Committee has been appointed to consider this question as it affects our own Borough, and to inquire if any, or what measures can be adopted to improve the worst class of our cottage property. In the Health Report for 1885, some facts were given which need not be re-stated here, but it is to be borne in mind that unless an officer of health can certify that

The effects of
insufficient
ventilation and
cubic space.

Toxic principle
in respired air.

Sub-committee
on unhealthy
dwellings.

any given house is so "*dangerous to health as to be unfit for human habitation*," nothing can be done in the way of demolition or closure. No such cottages as those alluded to above, without through ventilation, &c., are now permitted to be built, and it would appear that, except in a few isolated cases here and there, natural processes of decay and removal will have largely to be the factors in removing these dwellings from the town.

The Acts of Parliament relating to the houses of the working classes may be arranged under three heads, those known as "The Labouring Classes Lodging Houses Acts," which enable municipal authorities to provide and manage Lodging Houses; those known as Sir Richard Cross's Acts, "The Artizans and Labourers Dwellings Improvement Acts," which apply chiefly to the wholesale demolition of property in districts condemned as "insanitary areas;" and "The Artizans Dwellings Acts," 1868 to 1885, often known as Torren's Acts.

It is under the latter group that action is usually taken, when a house is dealt with by a health authority, as being absolutely unfit for human beings to dwell in. In Leicester, ample provision is at the present time being made for the housing of the well-to-do artisan, but it is for that section of the community which can ill afford to pay more than three shillings or three-and-sixpence per week, for house rent, that better provision is required; and if, following the example of some towns, where blocks of houses have been erected on a semi-philanthropic basis, but which yield a small rate of interest, means can be devised, either with or without the aid of the Corporation, to provide decent habitations at the same rentals as that now paid for miserable homes, it is but reasonable to suppose the people will gladly avail themselves of them.

Need for a better
class of smallest
properties

Lodging Houses.—The common Lodging Houses of the Borough are at present 29 in number. A large workshop in Woodboy-street has been converted for this purpose, and forms a more satisfactory common Lodging House than many

**Unsatisfactory
Lodging Houses.**

others which exist in the town. It has, in fact, been a question under consideration, whether some of the present houses should not be condemned as unfit for the purposes for which they are used. It is certain that there is a wide field here, either for the municipal authorities or private enterprise, to provide a much more satisfactory class of Lodging House than at present obtains, with fair chance, also, of making it a pecuniary success. A vigilant watch has been kept upon all of them, and the Sanitary Bye-Laws enforced. One owner was prosecuted and fined 10s. and costs, for permitting over-crowding.

**Slaughter House
nuisance.**

Slaughter Houses and Bake-houses.—These have been systematically inspected, and their cleansing and white-washing regularly performed. It is unsatisfactory to have to say that no further steps have yet been taken with a view to the ultimate removal of the Slaughter Houses out of the Borough, and the more general use of the public abattoirs. There is nothing new to add to the lengthy communication on this subject contained in last year's Report; but two illustrations have occurred during the year just ended shewing how desirable it is that this work should be carried on in public Slaughter Houses, under efficient inspection, apart from all ordinary sanitary considerations.

**Possibilities of
diseased animals
being sold as
meat.**

The case of the diseased swine mentioned on page 32 is one: the other was a case deserving still more serious attention. In January the Meat Inspector discovered the carcase of a cow, hanging in a Slaughter House, killed and dressed in the ordinary way for the market. From information he had obtained he seized it, and upon being carefully examined, it was found diseased, and condemned before the magistrates as unfit for consumption as human food, and a prosecution instituted, when the following facts came out:—The animal had been suffering from an acute disease in a cow-shippon, and late at night it was dragged through the snow, either dying or dead, to the Slaughter House where it was found, and there dressed and prepared in

the customary manner for meat ; and by those who heard the evidence but little doubt was felt that had it not fortunately been found when it was, it would quickly have been disposed of as food, to the possible danger of the consumers. The Magistrates shewed their view of the case by convicting the defendant, and imposing a sentence of one month's imprisonment, without the option of a fine ; on appeal, however, the conviction was quashed, on the ground that no actual attempt to sell it as meat had been proved.

Factories, Offensive Trades, Smoke, &c.—The few trades carried on within the Borough which are of an offensive character, and likely to create a nuisance, have been looked after and supervised. In two instances the boiling of tripe, upon premises not properly adapted for this work, was prohibited. During the summer months, complaints were received of a nuisance arising to the neighbourhood from the operations of a tallow-chandler, and he undertook during the very hot weather to stop the melting of grease and fat, &c. In October, complaints were received from Cardigan-street, of offensive smells and clouds of dust and dirt, arising from some business carried on there. On visiting the premises, there was found in progress a combination of offensive operations not often met with in one establishment, *i.e.*, soap boiling, the manufacture of artificial manure, and the burning of “scrap leather.” These works have since been closed altogether.

Unusual
combination of
nuisances.

No prosecutions have been necessary during the year, in dealing with the smoke nuisance from factory chimneys ; but several offenders have been cautioned and threatened. Speaking generally, Leicester, for a manufacturing town, does not suffer much from the nuisance of black smoke, and compares in this respect very favourably with any similar town in the country.

Gas Impurities.—The subject of the more efficient purification of the gas, especially from its sulphur compounds, has again attracted some attention during the year, and the

Decreased
amount of
sulphur in gas.

matter has been before the Town Council. It is satisfactory to find that the Gas Committee have, by using a better quality of coal, considerably reduced the amount of sulphur in their gas, it averaging at the present time about 27 grs. per 100 cubic feet. Arrangements are also in progress for the appointment of an official gas examiner, who will furnish a periodical report, independent of that from the Gas Works.

Sanitary Legislation in 1887.—During the parliamentary session of 1887, sanitary legislation did not figure prominently among the work done, though one or two small Acts of some importance were passed.

Stringency of
present law
relating to sale
of butter
substitutes.

The “Margarine Act” occupied much attention, probably because important trade interests were involved. It has long been known that for some years enormous quantities of these various butter substitutes were imported into England, but very little could ever be found as such, at the retail shops, and the numerous prosecutions constantly taking place through the country shewed that much of this material, wholesome enough in itself, if properly made, was palmed off upon the consumer as genuine butter. The law now compels all butter substitutes to be labelled as such, *when exposed for sale*, and *when handed to the customer*. Heavy penalties can be inflicted upon fraudulent sellers.

Modus operandi
of Allotment
Act.

The “Allotments Act” makes it possible for sanitary authorities throughout the country to provide facilities for labourers and others to acquire land, in plots not exceeding one acre in extent. This Act provides that six ratepayers may call upon the Sanitary Authority of the district in which they live, to consider the desirability of putting the provisions of this Act into force, and if, after enquiry, it is found there is a demand for allotments, and “that such allotments cannot be obtained at a reasonable rent and on reasonable conditions, by voluntary arrangements between the owners of land suitable for such allotments, and the applicants for the same, the Sanitary Authority, subject to the

provisions of this Act, shall, by purchase or hire, acquire any suitable land which may be available, whether within or without their district."

The "Open Spaces Act," already alluded to, was introduced by Sir John Lubbock, and affords further facilities for providing open spaces within large towns. The Sanitary Committee petitioned both Members for Leicester to support this Bill, which they undertook to do. It was passed on Aug. 23rd, and came into operation immediately.

The "Water Companies (Regulation of Powers) Act" is a small Act which limits the power of Water Companies, in England and Wales, to cut off the tenant's water for non-payment of the water rate, where such rate is paid by the landlord.

As shewing the need of amendment to the various Sanitary Statutes, the following extract from the report of the Select Committee, to whom is now always referred any Bills relating to police or sanitary regulations, which are an extension of or repugnant to the general law, may be of interest.

Since the Committee was originally appointed, "session after session has passed without any general enactments, to meet the divers wants of important and growing urban communities, receiving the assent of Parliament. In the absence of such legislation, and pending its arrival, the Committee *have not felt themselves justified in refusing special powers to sanitary authorities,*" although they recognized the disadvantages of such piecemeal legislation.

Special powers
sanctioned
to Sanitary
Authorities.

Work of Sanitary Inspectors, Special House Inspection, &c.--The house-to-house inspection is making steady but somewhat slow progress: the time of the Inspectors has been taken up considerably, towards the close of the year, by the cases of Small Pox met with. Nevertheless, houses have been thoroughly overhauled, and sanitary defects discovered in a very large number of these. As in former years, many of these

Dangers from
defective
Plumbing.

defects have been of a character to seriously endanger the health of the inmates, and are often discovered on making examination of houses and premises where one or other of the infectious diseases have occurred. Some of the careless work of ignorant or culpable workmen is often such as would scarcely be credited, unless actually seen. In connection with the work of Plumbers, who in the past have been among the worst sinners in planning these defects and dangers in our dwelling-houses, a very useful movement has been set on foot by the Worshipful Company of Plumbers of the City of London, who, with a view to protect the public against dangers arising from the blunders of incompetent workmen, have organized a system of examination and registration of all Plumbers who chose to submit themselves to the same; and this movement has received the co-operation of a large number of the leading masters in the trade, in various parts of the country, Leicester among other towns, and one of our ex-Town Councillors has been elected on the council to manage the scheme. Offshoots, or branch societies, have also been formed in Edinburgh, Manchester, &c. At present, of course, the movement is purely a voluntary one, but as it extends and its beneficial objects are clearly seen, it will probably become obligatory on all those who wish to follow the calling of Plumbers, to show they have the requisite skill and knowledge, before being permitted to undertake such work.

Lessened
difficulty in
getting
Sanitary defects
remedied.

The ordinary routine work of the Sanitary Department has suffered no abatement during the past year, and the following report of Mr. Allen, the Chief Inspector, as to the details of it, speak for themselves. It is satisfactory to observe from this that the necessity for legal compulsion, in getting sanitary defects remedied by property owners, &c., is gradually becoming less, a very large proportion of the orders being of an "informal" character. The decrease of cow-shippens within the precincts of the Borough, or at least within the populated area of it, is also a thing to be noted with approval as tending to remove a fertile source of nuisance arising from manure-pits, &c., inseparable from the keeping of large numbers of living animals.

Chief Inspector's Report upon the work of the Sanitary Department during 1887.

TOWN HALL, LEICESTER,

March 27th. 1888.

To the Medical Officer of Health.

DEAR SIR,

Herewith I beg to hand you the report of the Sanitary Work, &c., of the Borough, carried on during the past year, accompanied with detailed statements setting forth the particulars of the same.

I am, Sir, yours faithfully,

FRANK W. ALLEN,

Chief Inspector.

During the past year, 6073 houses have been examined and reported upon, in the course of house-to-house inspection. The premises inspected having consisted largely of better class houses, warehouses, shops, &c., with internal drains and sanitary fittings, which were suspected in many instances to be defective, but without any positive appearances of unsoundness, the Inspectors have been compelled to work with the smoke test to a greater extent than heretofore.

The examination of the properties has occupied more time in consequence, but it has been expended to advantage, for numbers of most dangerous defects have been discovered, all the more dangerous because hidden.

Several blocks of houses of the artisan class were tested also, but the defects found therein were very few, and chiefly external.

The total number of houses and premises tested by means of the "smoke-test" apparatus, during the year, has been 514, and in 277 of these more or less serious defects were found.

The following table shows the dangers to which the occupants of houses of the better class are exposed :—

Localities of sewer gas escapes discovered in the course of inspection with the smoke test, during 1887.

Into Sitting-rooms	7
„ Dining-rooms	2
„ Living-rooms	1
„ Kitchens and Sculleries	27
„ Basement Kitchens	4
„ Cellars	30
„ Pantries	6
„ Internal Water-closets	7
„ Work-rooms	1
„ Lobbies and other parts of houses ..	19
„ External Water-closets	56
„ Yards from around badly-set gullies, defective drains, &c.	70
And from external soil pipes	4
From Rain-water down-right pipe-heads and joints, the pipes in some cases connected directly to foul drains, and in others to cisterns having untrapped overflows	84
From Rain-water pipes connected direct with heads just below the level of bed-room windows	9

In 18 of the cases of sewer gas escapes into houses, the defects were in connection with internal unventilated soil pipes.

A large number of direct cellar drain connections have either been cut off and stopped outside, or properly disconnected by ventilated syphons; and the number of proved defects in cellars, as shown above, confirms the suspicions with which these connections have been regarded.

Drains found to pass underneath houses have also been carefully dealt with, in some instances by disconnection and ventilation, in others by the alteration of the drainage so as to run clear of the houses, in which cases the old drains were taken up and properly stopped.

Many of the worst cases of escapes of sewer gas were found to arise from rain-water cisterns placed inside the houses, underneath the floors of sculleries or kitchens. These in some instances were abolished, and in others the overflows were treated as cellar drains, *i.e.*, by disconnection—with the addition of reflux valves.

The courts and houses that do not front public thoroughfares have been regularly and carefully inspected, and those that are difficult to keep clean have been visited by a Corporation workman, for the purpose of cleansing the closets, &c. Nothing that the Inspectors can do, however, will deter the people who inhabit those places from allowing the closets to become filthy, the excuse generally being that the nuisance is caused by outsiders. This is no doubt true in some cases, and can only be met by the provision of public conveniences in these localities.

Twenty-five common privies have been abolished during the year, and it is hoped that the bulk of the remaining ones, something less than 100 in number, will be abolished during the coming year.

A very large number of portable ashbins have been provided during the year, the total number within the Borough now reaching 1500. The ashbin is a decided improvement upon the "dustpit," even when covered in and ventilated; but it is a question if it would not be advisable to at once adopt a standard "Borough pattern" bin, to be used in all cases, whether for new buildings, or for alterations carried out under sanitary orders.

There has been a decided decrease in the number of complaints received, brought about, no doubt, by the more systematic removal of household refuse, the introduction of portable dustbins, and the sanitary improvements carried out under the direction of the Committee.

In connection with infectious diseases inspection, the following defects were found, *i.e.*, in the houses referred to in the certificates, or in the houses in the same yards:—

Defective and foul ashpits	37
Defective and dilapidated closets	71
Defective and choked drains	64
Defective and unventilated soil pipes....	15
Defective urinals and bath and lavatory wastes	18
Foul brick and defective shafts to sink ..	60
Sink wastes connected direct	8
Foul and defective rain-water cisterns ..	8
Filthy and dilapidated houses	77
Filthy closets and passages	29
Defective paving	70
Defective, untrapped, and badly-set gul- lies, to sink and yard drainage.....	105
Polluted wells.....	3
Defective privy	1
Cellar drains directly connected to sewers	21

Escapes of sewer gas into

External water closets	18
Cellars	3
Living rooms, kitchens, and sculleries	9
Yards, from defective drains, badly- set gullies, rain-water drain pipes connected direct, &c.	60

The slaughter-houses have been visited every week, some of them several times a week, and this closeness of inspection has no doubt, to some extent, prevented the slaughtering of poor and diseased cattle within the Borough.

The cow sheds and dairies have been regularly visited, and improvements have been effected in some of them that will tend to the better health of the cattle, and the proper preservation of the milk. The trade of cow keeping appears to be on the decline within the Borough, owing probably to the cheap rate at which milk from the country can be delivered at the railway stations. Of the 93 cow keepers registered, only 70 now carry on the business; and although there have been standings for 643 cows, they have only 382 cows occupying the sheds.

There have been 16 prosecutions during the year, viz.:—Three for neglecting to carry out sanitary orders—one to pay costs, the other two 20/- and costs each; one for keeping swine, so as to be a nuisance, fined 20/-; one in reference to a carcase of diseased meat, dismissed on appeal; and 11 under the Sale of Food and Drugs Act.

The following Statements, A, B, C, and D, will explain themselves. I would only add that 50 per cent. of the work carried out during the year has been done under Informal Orders, and that the Sanitary Inspectors and the Inspector of Meat have paid the greatest attention to their many and varied duties.

STATEMENT B.

Shewing work carried out under Formal and Informal Orders, during the Year 1887.

	No. of Orders.
To abolish Manure-pits and Ash-pits	153
„ repair do. „	279
„ erect new do. „	10
„ provide Ash-tubs or bins	241
To abolish Privies	25
„ „ Privy Cesspools or Vaults	15
„ „ Pail Closets	11
To erect new Water Closets	56
„ „ „ Pail Closets	22
„ repair, alter, or rebuild Closets	204
„ fix Closet Basins and Syphons	78
„ fix Flushing Apparatus and lay on Water Supply	59
„ repair do. and do.	105
To alter and ventilate Soil Pipes	236
„ fix ventilated Syphons	286
„ lay New Drains	31
„ relay or repair Defective Drains	455
„ clear Choked Drains	232
To abolish Cisterns and fill up and cover Wells	9
„ cleanse or repair Cisterns	110
To fix lead or Iron Sink Wastes	477
„ fix Traps or Gully Gratings	883
„ reset Gullies or provide new Gratings	151
To erect, alter, screen, or repair Urinals	164
„ repair, re-hang, or provide new doors for Closets and Dwellings	118
„ repair, renew, and make good Spouting	206
„ cleanse and limewash Closets and Passages	359
To pave Yards and Passages, or repair paving	581
„ provide new, or relay and repair Floors	233
To repair Roofs	217
„ repair dilapidated Houses	8
To cleanse and limewash Houses	1076
„ cut off, take up, and stop old drains	95
To ventilate Workshops and Dwellings	1
„ remove Manure and offensive matter	5
To remove Animals kept in such a condition as to be a nuisance	143
To close Wells, and lay on Waterworks supply of water ..	19
Miscellaneous	510
Total	7873

STATEMENT C.

Shewing the number of Offensive Trades carried on, and Registered and Licensed Premises within the Borough, requiring the attention of the Inspectors.

DESCRIPTION OF TRADE.	No.
Slaughter Houses	70
Tripe Houses	29
Common Lodging Houses	29
Bakehouses	179
Cow Sheds	93
Milk Shops and Dairies	203
Tallow Melters	4
Grease Works	1
Ammoniacal Liquor Works	2
Chemical Works	2
Carpet Beating Works	1
Fellmonger	1
Bone Boiler	1
Soap Boilers	2
Knacker's Yard	1
Total	618

STATEMENT D.

Shewing the visits made by the Inspector of Meat, and the quantity of Meat, &c., condemned during the year.

No. of visits to Slaughter Houses	5302
Do. Cowsheds, Dairies, and Milkshops	4367
Do. Cattle Market	101
Total	9770

In addition to this, the stalls in the Fish and Poultry Markets have been visited several times every day, and the stalls in General Markets on Wednesdays and Saturdays also, the Inspector being on duty in the Market throughout the whole of the Saturday.

MEAT, &c. CONDEMNED AND DESTROYED.

	Tons.	Cwts.	Qrs.	Lbs.
Meat	3	3	0	20
Fish	34	7	1	17
Fruit	0	15	3	3
Poultry	53 head.			
Rabbits	204 "			
Hares	8 "			
Oysters	100 score			

Part II.

FEVER HOSPITAL.

Report for Twelvemonths ending Dec. 31st, 1887.

The report of the Fever Hospital may be considered extremely satisfactory in almost every respect. The work it has done has been less than in the preceding twelve months, but only because there has fortunately been less infectious disease within the Borough.

The total number of patients admitted during the year was 189, against 457 in the preceding year. Of these, 151 were suffering from Scarlet Fever, 10 from Small Pox, 11 from Typhoid Fever, one Chicken Pox, one Erysipelas, and one was a non-infectious disease (see Table B). Of these only three died, a mortality unprecedentedly low, for the records of an infectious disease hospital.

As shewing how steadily the hospital is growing in favour with the inhabitants of the town, and how they are beginning to appreciate its benefits, it is only necessary to say that more than 55 per cent. of the total number of cases of Scarlet Fever, occurring in the Borough, were removed here for treatment; and out of the 151 patients thus removed only one died, a lower death rate probably than ever before recorded amongst the same consecutive number of cases of this disease. The following tables, A, B, C, D, give full details of the various cases under treatment:—

Less objection
to Hospital.

STATISTICS OF FEVER HOSPITAL.

Details of Cases under treatment during the year
ending December 31st, 1887.

TABLE A.

General Summary.

Remaining in Hospital, December 31st, 1886 ..	51
Admitted during the year 1887	189
Total under Treatment	240
Discharged cured	227
Died	3
Remaining in hospital, December 31st, 1887 ..	10
TOTAL	240

TABLE B.

Shewing Number of Various Diseases with the
Death Rate of each.

	In hospital Dec. 31, '86.	Admitted.	Discharged Recovered.	Died.	Mortality per cent.	Remaining in hospital Dec. 31, '87.
Scarlet Fever	51	151	195	1	0.49	6
Small Pox ..	0	10	6	0	0	4
Typhoid Fever	0	13	11	2	15.3	0
Chicken Pox ..	0	1	1	0	0	0
Erysipelas ..	0	1	1	0	0	0
Unclassified ..	0	1	1	0	0	0
Totals	51	177	215	3	1.3	10

N.B.—There were also admitted fourteen persons to the Quarantine Wards, who had been exposed to the infection of Small Pox: two of these developed this disease whilst in Quarantine, and are included in the above figures.

TABLE C.

Showing Monthly Admissions of Scarlet Fever.

January	30	July.....	4
February	22	August	11
March	14	September.....	7
April	14	October.....	12
May	10	November.....	7
June	9	December.....	5
		Total....	151

TABLE D.Ages of Patients admitted suffering from
Scarlet Fever.

Ages of Patients.	No. Admitted.	No. of Deaths.
Under 1 year	0	0
From 1 to 2 years ..	3	0
„ 2 to 3 „ ..	15	0
„ 3 to 4 „ ..	16	0
„ 4 to 5 „ ..	18	0
„ 5 to 6 „ ..	17	1
„ 6 to 7 „ ..	21	0
„ 7 to 8 „ ..	10	0
„ 8 to 9 „ ..	8	0
„ 9 to 10 „ ..	9	0
Over 10 years	34	0
Total	151	1

The thirteen patients suffering from Typhoid Fever were admitted in September and October, during the time when the Wards at the Infirmary were full, owing to the increased prevalence of this disease, both within and without the Borough, during those months.

Fatal cases of
typhoid.

Two of these proved fatal, one being in a very precarious condition when admitted. Most of the other cases were of a mild character, but there was an unusual tendency to relapses amongst them, and the same tendency has been reported from amongst the larger numbers treated at the Infirmary. Of the thirteen patients, ten came from the Borough and three from the County.

The ten cases of Small Pox were admitted during November and December, full details of which have already been given. One came from the County and nine from within the Borough. Two of these, a man and a child, were unvaccinated and suffered most severely; the remaining eight had all been vaccinated and passed through attacks of the mildest character, in seven of them the eruption was quite abortive.

Of the Scarlet Fever patients, three came from outside the town, the remaining 148 from within the Borough boundaries. Speaking generally, the cases were of a mild type, with occasional exceptions.

Complications
of Scarlet Fever
cases.

The one fatal case was a child, aged five years, who succumbed to the most dangerous of the sequelæ met with in this disease, nephritis with albuminuria and general dropsy, dying at the eighth week from the onset of the attack. Amongst the complications met with were two cases of Chicken Pox, which followed on immediately, or almost before, the pyrexia from the Scarlatina had subsided, and two cases in which the disease ran on into Typhoid Fever. In one instance there was a distinct relapse, or second attack, after all the symptoms of the first attack had subsided. Five cases were followed by albuminuria, two of which had also otorrhœa. In nine patients the attack was followed by otorrhœa, three had arthritic pains of a rheumatic character, and one had a most uncommon sequelæ in the shape of an attack of tetanus, coming on periodically for nearly a fortnight. This patient ultimately made a perfect recovery. In five instances suppuration of the cervical glands was met with.

TABLE E.
Expenditure.

Expenditure.				£	s.	d.	£	s.	d.
Drugs	..	..	..	21	2	2			
Instruments and Appliances	..	..	..	9	18	9			
Wines and Spirits	..	..	..	10	4	0			
Disinfectants	..	..	..	5	8	0			
							46	12	11
HOUSE EXPENSES:—									
Salaries and Wages	..	..	..				359	19	5
Butchers' Meat, Fish, and Poultry	..	..	..	218	0	9			
Bread	..	..	..	33	1	1			
Butter	..	..	..	62	7	11			
* Milk	..	..	..	107	12	5			
Ale and Porter	..	..	..	33	11	4			
Groceries and other Provisions	..	..	..	126	8	5			
Gas	..	..	..	55	14	4			
Coal	..	..	..	125	19	0			
							793	1	3
Advertising, Printing, and Stationery	..	..	..	3	15	5			
Linen, Woollen, and Smallwares	..	..	..	15	0	5			
Bedding	..	..	..	28	13	4			
Fixtures and Furniture	..	..	..	54	14	1			
Domestic Implements and Utensils	..	..	..	30	17	3			
Alterations and Repairs	..	..	..	192	12	11			
Painting and Whitewashing	..	..	..	0	5	8			
Rates, Taxes, and Insurance	..	..	..	9	6	1			
Carriage of Goods and Postage	..	..	..	0	0	0			
Garden Seeds, Plants, &c.	..	..	..	9	0	0			
Water Rate and Fittings	..	..	..	1	11	0			
Rental of Telephone	..	..	..	19	0	0			
Harness, Cart, and Ambulance	..	..	..	5	7	10			
Sundries	..	..	..	18	5	7			
							388	16	4
							£1558	9	11
Receipts.									
Amounts charged for Maintenance of County Patients	..	..	..				61	12	7
Amounts charged for use of Disinfecting Chamber	..	..	..	2	0	0			
Sale of Hay and Garden Produce	..	..	..	4	9	7			
							11	15	7
							£103	8	2

* N.B. These amounts are for the actual quantities and expenses incurred during the year. Other figures in this table shew the actual payment made during the same time. H. T.

In table E. the expenditure for the year is seen to have been £1558, from which is to be deducted £103 monies received, leaving a nett expenditure of £1455.

The patients under treatment were 240 in number, giving as the total cost per patient £6 1s. 3d.

Cost per
occupied bed.

The daily average number of occupied beds throughout the year was 25, and the average length of time that each patient remained in hospital was 38 days. The cost per occupied bed was therefore £1 2s. 4d. per week.

This cost per patient is considerably higher than in the preceding year, and is partly accounted for by the fact that more adults were in hospital than in 1886, and that patients suffering from Typhoid Fever cost much more for their maintenance and treatment than do Scarlatina patients. But the chief factor in the increased cost of the past year, over its predecessor, is to be found in the fact, well known to administrators of hospitals, and especially Fever Hospitals, that the larger the number of patients under treatment, the smaller the cost per head, and *vice versa*, and that the working expenses of such institutions cannot be reduced *pari passu* with the reduction in the number of patients.

New disinfecting
apparatus. During the coming year an item of considerable amount will figure in the expenditure, as the Committee have resolved to substitute for the present unsatisfactory disinfecting machine an apparatus of the latest and most approved description.

A small matter, but one worthy of notice, is that amongst the names in the following list of persons who have made useful and welcome presents to the hospital, are some who have received the benefits of treatment within its walls; gratitude in this respect being too often represented by the algebraical sign of *x*.

List of Presents, with the Donors thereof.

- MISS ROSS, Stoneygate, an eider-down quilt.
- THE REV. CANON VAUGHAN, supplies of toys, books, papers, &c.
- WYGGESTON SCHOOL GIRLS, flowers.
- ST. LUKE'S CHURCH, ..
- ST. LEONARD'S CHURCH, ..
- ST. MATTHEW'S CHURCH, ..
- THE MISSES CROSSLEY, 30 vols. of new books for Nurses' Library.
- A. DONISTHORPE, ESQ., copies of Graphic.
- CHILDREN OF MR. COUNCILLOR FRANKLIN, toys and scrap-book.
- MISS HILL, children's magazines.
- SERVANTS OF REV. CANON VAUGHAN, Christmas cards & books.
- THE REV. — JONES, copies Illustrated London News.
- REV. W. H. MARRIOTT, Graphics and Illustrated London News.
- MISS JACKSON, Gallowtree Gate, handsomely decorated screen.
- FRIENDS OF TWO PATIENTS, swinging hammock cot with awning.
- A FRIEND, a card for each patient on Christmas morning.
- MR. ALDERMAN WINDLEY, newspapers, weekly supply.

Part III.

VITAL STATISTICS.

Area Population and Density.—No extension to the Borough has taken place during the year 1887, the area within the municipal boundaries being as hitherto, about 3030 acres. The population, as estimated by the Registrar-General, at the middle of the year was 143,153, probably something higher than the actual figures, as this estimate is based upon the supposition that the annual increase to the population, since the last census, has been at the same rate as during the preceding ten inter-censal years. At the present time, however, building, especially of cottage property, is proceeding apace, so that by the time the next census is taken the estimate may possibly be found not so very far wrong. For the purposes of these statistics, and in the absence of any more accurate estimate, the above figures will be adopted, and the various calculations made will be based thereon. Seeing how the rate of increase of population varies, especially in large communities, during different decennial periods, it would be highly satisfactory if some arrangement could be made for having a quinquennial census, taken of at least the larger towns of the kingdom. On the above figures, the density per acre is about 47 persons, against 46 in the preceding year. These figures, however, give no correct idea of the actual density per acre, as large tracts of land within the Borough boundaries are entirely unbuilt upon, whilst in the older parts of the town every available square yard is occupied with houses. Thus, in All Saints' Ward, the persons per acre are probably not less than 115, while in West St. Mary's there are at present only about 19 souls per acre.

Estimated
population
probably too
high.

Varying density
in different parts
of the town.

TABLE I.

Showing the Population, Inhabited Houses, Marriages, Births and Deaths, for the Year 1887, and ten years preceding.

The Year.	Estimated Population.	No. of Inhabited Houses.	Marriages.	Registered Births.	Corrected Number of Deaths.			Deaths in Public Institutions.
					Total all ages.	Under one year.	Under five years.	
1887	143,153	*27,558	1169	4689	2722	1011	1407	180
1877	117,462	23,605	1183	4753	2515	897	1254	
1878	119,845	24,438	1107	4779	2500	981	1360	
1879	117,610	24,616	1141	4687	2651	878	1366	
1880	120,325	24,794	1179	4860	2960	1070	1727	
1881	123,120	24,974	1153	4711	2654	965	1374	
1882	126,275	25,511	1201	4855	2528	942	1297	
1883	129,483	25,818	1207	4823	2484	913	1271	
1884	132,773	25,937	1152	4851	2937	1133	1615	
1885	136,147	26,794	1114	4682	2641	907	1315	
1886	139,606	*26,934	1222	4858	2738	1052	1383	265
Average of ten years, 1877-1886	126,264	25,351	1165	4785	2660	972	1396	

NOTE a.—Population at census 1881 was 122,376. NOTE c.—Number of inhabited houses at census 24,974.

„ b.—Area of present Borough in acres 3030. „ d.—Average number of persons per house at census 4.9

* The number of inhabited houses in these years is estimated from data in Surveyor's office. In previous years the figures have been supplied by the Overseers.

Inhabited Houses and Rateable Value.—From data obtained in the Surveyor's Office, it is estimated that there were 27,558 inhabited houses in the middle of the year, being an increase of 624 upon the previous year's figures, and a much larger increase than took place during 1886 (see Table I).

The rateable value of the Borough amounts to £485,346.

Marriages.—The number of Marriages registered during the year was 1169, a decrease of 53 on those in 1886, and was equal to a rate of 15·1 per 1000 of each sex, a decrease of 1·4 on last year's returns. Not in Leicester only, but throughout the country generally, there has been a marked falling-off in the marriage rate, especially in our large towns: whether this is to be attributed solely to a diminished prosperity, due to commercial depression, and consequent lack of means for early entry into married life, or whether part of it is not also attributable to more care on the part of the working classes not to thoughtlessly contract improvident marriages, may be an open question; but if in any way the latter is a contributing factor, then a low marriage rate is not a thing to be altogether deplored, for there can be no doubt whatever that one of the causes at work favouring high infant mortality is the large number of too early and improvident marriages.

Births.—Following the Marriages, the Births shew a diminished number, only 4689 being registered, against 4858 in 1886 (see Table I.), equal to a birth rate of 32·7. The annual average birth rate of the last ten years has been 37·76 (see Table II).

In the 28 large towns of England, the birth rate last year was 32·2, whilst, excluding London, it was exactly the same as our own Borough, *i.e.*, 32·7. It ranged from 25·8 in Brighton, and 27·7 in Bradford, to as high as 39·1 in Newcastle and 41·1 in Cardiff. During the last ten years, the birth rate in these large towns has steadily fallen from 38·1 per 1000 to that recorded in the year now under review.

Of these births, 2375 were males and 2314 females. Amongst the births, 246 were registered as illegitimate, being 5·2 per cent. of the total number born.

Decrease of
Marriages.

Decrease of
Births.

TABLE II.

Shewing the Annual Birth and Death Rates, Death Rates of Children, and Proportion of Deaths in Public Institutions, in a Thousand Deaths, for the year 1887, and ten years preceding.

In Year.	Birth rate per 1000 of the Population.	Death Rate per 1000 of the Population.	Deaths of Children under 1 year per 1000 of Registered Births.	Deaths of Children under 1 year per 1000 of Total Deaths.	Deaths of Children under 5 years per 1000 of Total Deaths.	Deaths in Public Institutions per 1000 of Total Deaths.
1887	32.75	19.01	215.8	371.7	516.9	66.1
1877	40.46	21.41	188.7	356.6	498.6	
1878	39.87	20.72	205.2	392.4	548.0	
1879	37.31	21.10	187.3	331.1	513.0	
1880	40.39	24.70	220.1	360.3	581.6	
1881	38.26	21.56	204.8	363.2	517.7	
1882	38.44	20.05	194.4	372.6	513.1	
1883	37.24	19.18	190.7	367.5	511.6	
1884	36.53	22.12	233.5	381.6	543.9	
1885	34.38	19.39	193.5	343.4	513.8	
1886	34.80	19.61	216.5	384.2	505.1	96.7
Average of ten years, 1877-1886	37.76	20.98	203.4	365.2	524.6	

Vaccination.—

During the year 1887, there were successfully vaccinated in Leicester only 474 children, of which 188 were by the public vaccinators, and the remaining 286 were private vaccinations. These figures are obtained from official returns supplied by the kindness of Mr. Chamberlain, Clerk to the Guardians. They show a very marked decrease upon the returns of any previous year. In the year 1885, there were 1842 vaccinations, 979 public and 863 private; in 1886 there were 1122 vaccinations, 561 public and 561 private, shewing that the diminished numbers are in much greater proportion amongst the public than amongst the private vaccinations.

For the past two years all compulsion, or any attempt to carry out the vaccination laws, has been abandoned, and thus not only those persons who have a disbelief in the protection afforded by this operation against an attack from small pox, or have any other conscientious objection to it, are amongst the defaulters, but also large numbers of that numerous class who, from sheer carelessness and thoughtless ignorance, neglect to protect their children from this loathsome disease.

It is only from about the year 1883 that any considerable number of children have been allowed to grow up in the town without being vaccinated. An instructive return was published last year by the Leicester Guardians, which shewed that out of 33,659 children born from 1880 to 1886, both years inclusive, only 14,024 were known to have been vaccinated. It shows, also, that 4765 had died unvaccinated, leaving a total of 14,870 who had not been submitted to the operation. Seeing, however, that the mortality of children under five years of age is in Leicester very high, it will not be over-estimating it to set down another 2000 deaths as having occurred amongst these 14,870 unvaccinated children. It is to be noted, also, that 6430 have accumulated during the last two years to which the return refers, *i.e.*, in 1885 and 1886. Speaking roughly from these data, it may be assumed that there are from twelve to fourteen thousand unvaccinated children to-day within the Borough, or some 10 to 12 per cent. of the entire population. These particulars will be

Decrease of
Vaccination in
Leicester.

Vaccination
Laws in
abeyance.

Estimated
number of
unvaccinated
children in
Leicester.

of interest, not only to the inhabitants of Leicester, but to the country at large, which is watching with some interest as to what may be the ultimate result of this wholesale neglect of vaccination. They will also serve to correct the exaggerated notions that prevail in some quarters, that by far the greater proportion of the inhabitants of Leicester are unvaccinated, whereas exactly the opposite condition is the fact. Should, however, the present state of things continue to go on, and 10 per cent. only of the children born are vaccinated, as happened last year, then, in the course of eight or ten years from the present time, there will have accumulated a sufficient amount of "inflammable material" to warrant the use of the term "Leicester experiment" being applied to the town. Whether the present vigilant measures of isolation and quarantine will suffice to successfully deal with any outbreak of small pox which may then arise, time only can prove. One thing is, however, certain, that any of these unprotected children have but to be brought in contact with a breath of infection from small pox to almost inevitably contract the disease.

Deaths and Death Rate.—The mortality in the Borough last year was the lowest recorded for many years past. The actual number of deaths belonging to the town was only 2722, a decrease of 16 on the previous year.

Low mortality
during 1887.

Fortunately, it is an easy matter in Leicester to state correctly the deaths belonging to the Borough, as the only disturbing factors are the deaths of persons in the Infirmary and in the County Asylum, who do not belong to the town: these have to be abstracted, whilst the deaths of patients at the Borough Fever Hospital and at the Borough Asylum, situate outside the Borough boundaries, have to be added. This having been done, the total for the fifty-two weeks of 1887 is as stated above, and gives a death rate of only 19·01 per thousand for the year.

This is the lowest rate recorded for many years, and is 1·9 below the average death rate of the Borough for the past ten years. (See Table II.)

Mortality at different Seasons.—The following figures shew the mortality in the four quarters of the year, and those for the previous three years are also appended:—

	1887.	1886.	1885.	1884.
1st quarter....	712	658	750	623
2nd „	570	588	602	583
3rd „	782	829	746	942
4th „	658	663	543	821
Totals ..	<u>2722</u>	<u>2738</u>	<u>2641</u>	<u>2969</u>

With unvarying regularity the third quarter shews the highest mortality, whilst usually the second quarter has the fewest deaths. In the first quarter of 1887, diseases of the respiratory organs chiefly prevailed to swell the numbers, but Measles also contributed 53 deaths. The third quarter's high figures are caused by our annual scourge of Diarrhoea, though the numbers this year were somewhat below 1886.

Leicester compared with other parts of England. Throughout the country generally low death rates have prevailed during 1887. Since the year 1837, when registration was established, the death rate in England and Wales has not been so low, reaching only to 18·8 per 1000; the next lowest rate during the above period was in 1881, when the English death-rate was 18·9.

The death rate in the twenty-eight large towns of the country was equal, last year, to 20·8. If London (which is an exceptional community) be excluded, the death rate in the twenty-seven large provincial towns was equal to 21·9, ranging from 16·9 in Brighton to 28·7 in Manchester. (See Table III.) Leicester stands fifth on the health roll of the country, a position which, for a town containing so large a proportion of artizan population, cannot but be considered very satisfactory. Last year we were seventh from the top, so that we have improved our position by ²~~three~~ places; the only towns whose ^{corrected} death rates were lower than our own, during last year, were Brighton, Derby, Norwich, and Nottingham.

Position of
Leicester among
large towns.

TABLE III.

Death Rate of the large English Towns during
each of the past 10 years.

	1878.	1879.	1880.	1881.	1882.	1883.	1884.	1885.	1886.	1887
28 large Towns					22·3	21·6	21·6	20·5	20·9	20·8
London	23·0	22·7	21·6	21·2	21·4	20·4	20·4	19·7	19·9	19·6
Brighton	21·3	19·1	19·8	19·0	21·7	19·2	17·9	17·1	17·1	16·9
Portsmouth	19·9	17·6	19·8	19·7	21·5	18·6	19·4	19·7	23·8	19·5
Norwich	24·3	21·7	24·3	19·5	20·6	19·6	21·2	20·3	23·3	20·4
Plymouth	25·8	22·9	35·1	19·9	21·2	20·9	21·1	22·3	23·5	22·7
Bristol	22·2	21·9	21·0	19·6	19·2	17·9	18·4	19·7	19·3	20·4
Wolverhampton	23·5	23·0	21·3	21·2	22·4	21·3	23·4	20·2	22·2	21·7
Birmingham	25·5	22·1	20·7	20·0	20·9	21·3	21·4	19·3	19·9	19·7
Leicester	22·1	23·2	25·0	21·8	20·0	19·2	22·1	19·4	19·6	19·0
Nottingham	20·1	21·6	23·8	22·4	23·6	21·2	22·9	19·9	20·4	18·7
Liverpool	29·2	26·9	27·1	26·7	26·5	26·7	25·2	23·8	23·8	23·7
Manchester	29·2	28·3	26·9	25·5	26·7	27·6	26·4	26·5	26·3	28·7
Salford	27·1	26·7	28·0	22·6	23·2	22·4	22·3	21·1	22·1	22·2
Oldham	27·0	22·8	24·7	22·8	24·6	22·0	24·5	22·0	22·8	23·8
Bradford	24·1	22·9	22·9	19·7	21·2	18·4	20·1	17·7	19·2	19·0
Leeds	24·7	23·5	22·0	21·6	23·2	23·3	24·2	19·9	21·9	21·1
Sheffield	26·6	22·9	22·9	21·1	21·7	22·9	22·4	20·7	19·8	21·6
Hull	24·1	22·0	23·4	23·8	23·2	22·8	21·1	17·2	18·8	19·3
Sunderland	25·9	22·3	25·0	20·9	20·5	24·5	23·0	23·8	19·5	19·7
Newcastle	24·5	24·4	22·8	21·8	23·1	25·4	23·1	26·1	22·2	25·3
Derby								18·1	18·2	17·1
Birkenhead								19·5	19·1	21·0
Bolton								20·8	23·1	21·3
Blackburn								21·8	25·5	25·5
Preston								27·1	28·9	27·0
Huddersfield								20·1	19·6	23·0
Halifax								17·7	22·7	21·0
Cardiff								25·7	22·6	21·9

Could we but sensibly diminish the annual mortality amongst our infantile population, especially from Diarrhœa, in the third quarter of the year, Leicester might easily aspire to be the healthiest town in the kingdom.

True Comparative Death Rates.—In comparing one large town with another, it is always to be borne in mind that a correction is necessary before this can properly be done. The difference of sex and age-constitution of the various communities has to be allowed for. The necessary data for this correction was supplied by the Registrar-General, after the last census. When this disturbing influence has been corrected, as in Table IV., it will be observed that in most of the towns the death rate is slightly raised, though the relative position of the various towns is not much affected. Thus Leicester still remains fifth on the list, though bracketed equal with Hull.

The third column of Table IV. is one deserving of careful attention, and shews at a glance the relative mortality of our different English towns.

Translated into ordinary language, it means this, that when the inequalities of age and sex distribution of these large towns have been allowed for, for every thousand persons who died in 1887, throughout England and Wales, only 925 died in Brighton, 946 in Derby, 1058 in Leicester, and increasing to no less than 1702 in Manchester.

Mortality at different Ages.—In Table V., the population and deaths recorded in the Borough, during the year under review, are broken up into groups of ages, and this Table enables us to compare the death rates of these various groups with a similar standard Table drawn up for the whole of the country.

No more sensitive test of the health and sanitary condition, in its most extended sense, of any community, is to be found, than that afforded by the death rate of its child population.

TABLE IV.

Recorded and Corrected Death Rate in 28 large English Towns during 1887.

Towns in the order of their Corrected Death Rate.	Recorded Death Rates per 1000 per annum.	Corrected Death Rates per 1000 per annum.	Comparative Mortality Figure.
England and Wales....	18·8	18·8	1000
28 Large Towns	20·8	22·1	1175
Brighton	19·9	17·4	925
Derby	17·1	17·8	946
Norwich	20·4	19·0	1042
Nottingham	18·7	19·8	1053
Leicester	19·0	19·9	1058
Hull	19·3	19·9	1058
Portsmouth	19·5	20·1	1069
Sunderland	19·7	20·5	1090
London	19·9	20·8	1106
Birmingham	19·7	21·0	1116
Bristol	20·4	21·1	1122
Bradford	19·9	22·0	1168
Wolverhampton	21·7	22·3	1186
Birkenhead	21·0	22·5	1196
Leeds	21·1	22·5	1196
Plymouth	22·7	22·5	1196
Halifax	21·0	22·8	1212
Sheffield	21·0	23·2	1234
Bolton	21·3	23·4	1244
Cardiff	21·9	23·8	1266
Salford	22·2	24·1	1281
Huddersfield	23·0	25·3	1345
Liverpool	23·7	26·0	1383
Oldham	23·8	26·5	1409
Newcastle-on-Tyne	25·3	26·7	1420
Blackburn	25·5	27·8	1478
Preston	27·9	30·3	1610
Manchester	28·7	32·0	1702

TABLE V.

Estimated Population in Leicester at Five groups of Ages, with actual number of Deaths, and the Death Rate per 1000 compared with English Standard Life Tables.

	Estimated Population 1887.	Deaths 1887.	Mortality per 1000.	Deaths per 1000 of population living at various ages according to new English Life Tables.
Under 1 year	4637	1011	217.7	
1 to 5 years	14,593	396	20.2	
Total under 5 years	19,230	1407	73.1	61.0
5 to 20	45,895	131	2.8	4.8
20 to 40	43,781	286	6.5	8.5
40 to 60	24,675	376	15.2	18.3
Over 60	9572	522	54.5	71.9
All Ages	143,153	2722	19.0	19.5

Low death rate
in Leicester
at all ages over
five years.

Studying this Table, we see that the total death rate of Leicester (19.01), at all ages, is below that of these standard Tables, whilst the death rate of children under five years of age exceeds the same by no less than 12.1 per 1000. At every other age group after five years, *i.e.*, from 5 to 20 years, from 20 to 40, and from 40 to 60, Leicester is below the average rate of mortality; whilst its old people, aged 60 years and upwards, appear to be remarkably long lived, exceeding the average rate by no less than 17.4 per 1000.

Infant Mortality.—There have been registered during the year 1011 deaths of infants under one year of age, which is equal to a rate of 215.8 of the registered births, and is slightly lower than that of 1886, but exceeds the average of the same deaths during the preceding ten years by 12.4 (see Tables II. and VI). Infantile deaths shew a slight decrease on last year's records, in the 27 large towns of the kingdom, which in 1886 were equal to a rate of 177 per 1000; whilst this year they are 176 per 1000 births.

TABLE VI.**Infantile Mortality.**

Deaths under one year per 1000 Births.

	1887.	1886.	1885.
Derby	142	150	137
Portsmouth	143	174	131
Brighton	149	160	131
Bristol	149	149	152
Sunderland	151	151	158
Halifax	153	171	132
Birkenhead	156	162	137
London	158	159	148
Norwich	158	202	136
Hull	165	164	128
Nottingham	170	180	157
Bolton	171	186	160
Leeds	172	181	155
Cardiff	172	168	189
Newcastle-on-Tyne	174	155	172
Wolverhampton	176	175	140
Birmingham	176	175	157
Sheffield	177	168	164
Bradford	178	167	143
Huddersfield	181	167	157
Liverpool	186	188	174
Oldham	187	174	166
Manchester	191	183	175
Salford	195	198	174
Plymouth	196	154	156
Blackburn	201	209	170
Preston	214	233	218
Leicester	215	216	193
Average of 27 Provincial Towns	176	177	161

From Table VI. it is seen that Leicester again has the highest infantile death rate of any of these large towns, whilst Derby had the lowest. This same feature is year after year the one blot upon Leicester's health records, Preston and our own Borough being the two towns which are usually found at the bottom of the list.

The causes of this high infant mortality have been discussed year after year, in successive reports, and there is but little new that can be added thereto. The chief diseases which carry off these infant lives are given in Table VII., prominent amongst them, after diseases of the lungs, being Atrophy and Debility, which are credited with 212, Diarrhœa 209, Convulsions 128, and Premature Births 99. Of these, Diarrhœa is the one which shews such marked excess over other towns, though Atrophy and Debility are also high as compared with some other places.

Diseases to
which high
infant mortality
is due.

TABLE VII.

Rates of Mortality of Children, under one year of age,
from chief Infantile Diseases, per 1000 Births.

	1886.		1887.	
	Total Deaths.	Rate per 1000 Births.	Total Deaths.	Rate per 1000 Births.
From all causes	1052	216·5	1011	215·8
Atrophy and Debility	252	51·8	212	45·2
Diarrhœa	229	47·1	209	44·5
Convulsions	127	26·1	128	27·2
Lung Diseases	296	60·9	299	63·7
Premature Birth	95	19·5	99	21·1
Tubercular dis.	59	12·1	61	13·0
Measles	11	2·3	23	4·9
Scarlet Fever	5	1·0	0	0
Whooping Cough . .	18	3·7	26	5·5

Table VIII. shews the excess of infantile deaths in the third quarter of the year.

TABLE VIII.

Deaths in each Quarter of the Year under one
and over one year of age.

1887.

	1st Qr.	2nd Qr.	3rd Qr.	4th Qr.	Total.
Under 1 year	192	185	417	218	1012
Over 1 year	520	385	365	440	1710
Total	712	570	782	658	2722

1886.

Under 1 year	185	181	467	219	1052
Over 1 year	473	407	362	444	1686
Total	658	588	829	663	2738

1885.

Under 1 year	227	211	357	112	907
Over 1 year	523	391	389	431	1734
Total	750	602	746	543	2641

1884.

Under 1 year	191	169	513	260	1133
Over 1 year	432	414	429	561	1836
Total	623	583	942	821	2969

Illegitimacy and Infantile Mortality.—As tending to swell the rate of infantile mortality, illegitimate births always play an important part. During 1887 there were 246 of these births registered, whilst there were 101 deaths of illegitimate infants registered, giving a death rate per 1000 births of no less than 410, as against 215, the rate of the whole of infantile deaths.

District Mortality.—In the various wards of the Borough the death rate varies exceedingly. In Table IX., in which the calculations made are based upon the estimated population in each ward, and which may be considered approximately correct, the mortality is seen to vary from 8·8 in St. Martin's ward to 23·2 in East Margaret's. Of course it is to be remembered that St. Martin's is largely occupied by business premises,

Varying death
rate in different
parts of
Borough.

not merely dwelling-houses, and contains, for this reason, a diminished proportion of young children and old people : hence its low death rate, its population being largely composed of persons in the prime and vigour of life. But to East Mary's the same remark does not apply, the property here being as much residential as is that of East Margaret's, and yet its death rate is but one-half that of the latter ward. The explanation of this wide difference is at once found in the class of society living in the former ward, and the advantageous conditions under which they exist, compared with those of East Margaret's.

TABLE IX.

Deaths at Different Ages and Death Rates in various
Wards of the Borough.

	All Ages.	Under 1 year.	1 year to 5.	Over 5 years.	Estimated Population.	Ward Mortality per 1000 living.
1.—St. Martin's Ward	20	4	2	14	2,250	8·8
2.—N. Margaret's „	276	119	38	119	15,484	17·8
3.—M. Margaret's „	639	277	100	262	37,294	17·1
4.—E. Margaret's „	813	248	100	465	34,975	23·2
5.—E. Mary's „	119	33	17	69	10,123	11·7
6.—W. Mary's „	476	173	80	223	26,912	17·6
7.—All Saint's „	379	157	55	167	16,109	23·5
Total.....	2722	1011	392	1319	143,153	19·0

Classified Causes of Death.—The 2722 deaths recorded last year are divisible as follows:—In the first or zymotic group are 462, equal to 16·9 per cent. of the whole ; in the constitutional 399, or about 14 per cent. of the whole ; in the group known as local diseases are 1213, or over 44 per cent. of the total ; whilst the remainder are made up of the deaths from violence, 2·9 per cent. ; and those not accurately designated, and which are classed together as undefined, form 1·2 per cent. of the whole. (See Table X.)

TABLE X.

**Total Deaths, Death-rate, and per centage of Deaths
of the eight principal groups of disease.**

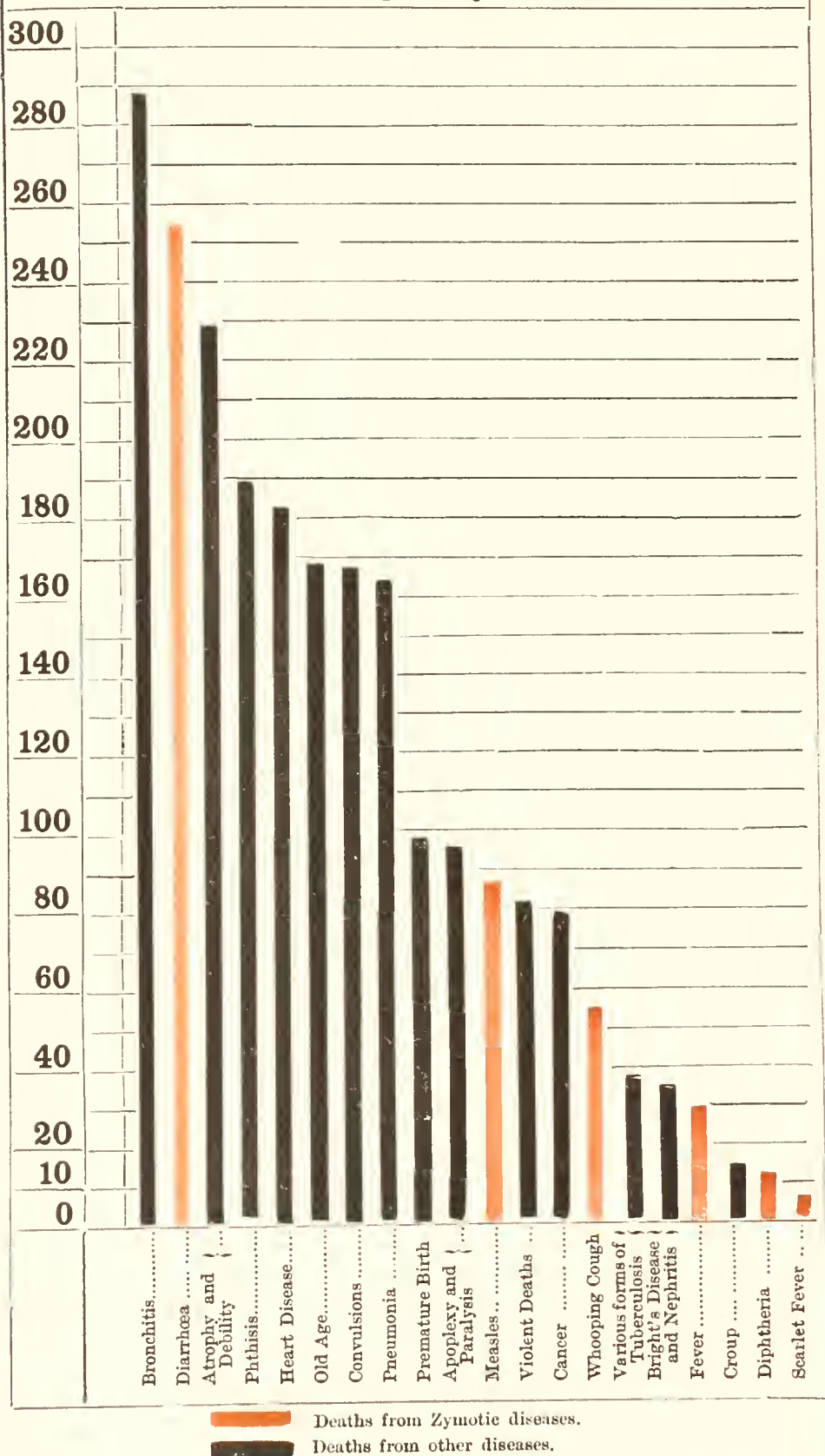
	1886.			1887.		
	Total Deaths.	Rate per 1000 living.	Per cent- age of Total Deaths.	Total Deaths.	Rate per 1000 living.	Per cent- age of Total Deaths.
Zymotic Disease..	420	3·0	15·3	462	3·2	16·9
Parasitic „ ..	3	0·02	0·001	..	..	..
Dietic „ ..	2	..	..	3	.	..
Constitutional ..	373	2·6	13·6	399	2·7	14·6
Local „ ..	1254	9·0	45·8	1213	8·4	44·5
Developmental ..	575	4·1	21·0	529	3·6	19·4
Violence	80	0·6	2·9	81	0·5	2·9
Ill defined	31	0·2	1·1	35	0·2	1·2

The various sub-divisions of these great groups or classes of deaths, arranged in various age groups, and shewing also the numbers male and female, will be found in the Appendix.

The following diagram presents to the eye, in a graphic form, the deaths from 20 of the principal causes of death during 1887, the zymotic diseases being distinguished by their colour.

Each of the several groups will now be considered separately and in some little detail.

Diagrammatic view of 20 of the principal causes of death during the year 1886.



CLASS I.—ZYMOTIC DISEASE.

Zymotic Death rate.—The total number of deaths in this class was 462, but included amongst them are several from Syphilis, Septicæmia, Erysipelas, Pyæmia, &c., some 24 in all; and which, although belonging to the zymotic group, are not included amongst the common zymotics or miasmatic diseases. Amongst these also are 256 from Diarrhœa, which disease, although placed amongst the zymotics, has a different position to those commonly known as the infectious diseases. Including the whole of these zymotic deaths, we have for last year a rate of 3·2 per 1000 per annum. Leaving out of consideration, however, for the present, the rarer diseases, and considering only those included under “principal zymotic diseases,” *i.e.*, Small Pox, Measles, Scarlet Fever, Diphtheria, Whooping Cough, “Fever,” and Diarrhœa, we have a zymotic death rate for last year of 3·05. (See Table XI.) This is a slight increase compared with 1886, when the rate for the same disease was 2·82. Upon analyzing these, as in Table XI., we find there has been a considerable increase in Measles and Whooping Cough, a lesser increase in the Diphtheria and Fever deaths, whilst there is a large decrease in Scarlet Fever and a smaller one in Diarrhœa.

In the twenty-eight large towns of the kingdom, a similar slight increase in the general zymotic death rate was observed last year, being 3·21 per 1000. The lowest zymotic rates were in Halifax 1·3, in Brighton 2·2, and in Plymouth 2·3; whilst it ranged as high as 4·4 in Blackburn, Salford, and Preston, and was no less than 4·9 in Manchester.

Zymotic
death rate of
other
large towns.

In Leicester almost one-half the zymotic deaths were due to Diarrhœa: with the exception of this and Measles, the Borough compares favourably with the other large towns, as will be seen as each disease is separately discussed.

TABLE XI.

Shewing total number of Deaths from common Zymotics and the Death-rate per 1000 in 1887, and during the previous ten years.

	Deaths in 1887.	Average No. per year during ten years ending 1886.	Death-rate per 1000 per annum in 1887.	Average annual death-rate per 1000 during the ten years ending 1886.
Small Pox	0	1'7	0	0'013
Measles	87	57'1	0'6	0'45
Scarlet Fever	5	83'6	0'03	0'66
Diphtheria	13	9'9	0'09	0'07
Whooping Cough ..	55	58'0	0'38	0'45
Fever	31	24'7	0'22	0'19
Diarrhœa	247	231'4	1'72	1'84
	438	466'4	3'05	3'99

Distribution of Zymotic Disease.—In Table XII. is given the distribution of these zymotic deaths, in the different wards of the Borough, and on the Map (see Appendix) is shewn the exact locality of those from Diarrhœa, Scarlet Fever, Diphtheria, and Fever. With the exception of Diarrhœa, it cannot be asserted that there was any special incidence in any particular locality. The fifth, or East Mary's ward, in proportion to its population, was the most free, and the remarks made under the head of general ward mortality apply with special force to the diseases now under consideration.

Amount of Sickness from Infectious Disease.—

Before speaking in detail of each zymotic, it will be well to briefly refer to the actual amount of sickness met with in the town during the past year, from those ailments of which we

Number of
persons
suffering from
infectious
diseases.

possess full information. From the means now placed at our disposal by the notification of infectious disease, we can state with fair accuracy, not only how many deaths have taken place, but *how many persons have been ill* from Small Pox, Scarlet Fever, Typhoid Fever, Diphtheria, Erysipelas, and Puerperal Fever.

TABLE XII.

Deaths in each of the Wards of the Borough from the Seven Chief Zymotic Diseases during 1887.

	Whoop- ing Cough.	Small Pox.	Measles	Scar- let Fever.	Diph- theria.	Fever.	Diarr- hoea.	Total.
1.—St. Martin's Ward	1	0	1	0	0	0	2	4
2.—N. Margaret's „	3	0	0	0	0	2	28	42
3.—M. Margaret's „	8	0	21	1	2	9	56	97
4.—E. Margaret's „	17	0	10	;	5	6	63	114
5.—E. Mary's „	3	0	3	0	2	1	5	14
6.—W. Mary's „	17	0	18	0	3	8	51	97
7.—All Saint's „	0	0	10	0	1	5	42	70
Institution deaths distributed.								

Compared with 1886 there is a very marked decrease, only 898 as against 1280, whilst in 1885 the number was 2397. On examining Table XIII., it will be seen that this decrease is chiefly due to the diminished number of persons suffering from Scarlet Fever, for, with the exception of Puerperal Fever, each of the others shew a greater or lesser increase. Thus, 222 persons were said to have suffered from Typhoid Fever, against 141 during 1886; 308 from Erysipelas, against 258; from diphtheria 81, as against 51; and Small Pox 9, as against 1.

TABLE XIII.

Shewing number of persons suffering from Infectious Diseases during each of the years 1887, 1886, and 1885.

1887.	Scarlet Fever.	Typhoid Fever.	Diph- theria.	Ery- sipelas.	Puerperal Fever.	Small Pox.
First Quarter	108	20	23	71	0	0
Second „	64	19	14	58	1	0
Third „	35	102	10	67	0	0
Fourth „	65	81	34	112	5	9
Total in 1887	272	222	81	308	6	9
1886.	Scarlet Fever.	Typhoid Fever.	Diph- theria.	Ery- sipelas.	Puerperal Fever.	Small Pox.
First Quarter	253	14	5	71	1	0
Second „	145	26	11	53	3	1
Third „	219	45	9	63	3	0
Fourth „	200	56	26	71	5	0
Total in 1886	817	141	51	258	12	1
1885.	Scarlet Fever.	Typhoid Fever.	Diph- theria.	Ery- sipelas.	Puerperal Fever.	Small Pox.
Total in 1885	1816	216	55	294	8	8

Small Pox.—No death occurred from Small Pox. This is the fourth year in succession (see Table XIV.) that the Borough has had no death from this disease. The deaths from Small Pox, throughout the country, shew a slight increase on the

previous year, though still small in number compared with some former years; they were 505. Of these, 332 occurred in the twenty-eight large towns of the kingdom, only 9 were recorded in London, 1 each in Liverpool, Preston, Leeds, and Newcastle, 2 in Hull, 2 in Birmingham, 3 in Portsmouth, 4 in Blackburn, 6 in Manchester, 11 in Carlisle, 13 in Bristol, and 278 in Sheffield.

Details of the *cases* that have been met with in our own Borough, during the year, have already been given.

Measles.—Double the mortality occurred during 1887, from Measles, than in the year 1886. 87 deaths were caused by it, as against 43 in the previous year; and it is the largest number recorded since the year 1880, when 166 deaths were registered from this disease. The average number of deaths from Measles during the preceding ten years has been 57. (See Table XIV.)

Increased
mortality from
Measles.

Throughout the country generally, Measles have been more fatal during the year now under notice than in any year since 1840. In the twenty-eight large towns, the death rate was equal to 0.79 per 1000, as against 0.6 in our own Borough, so that Leicester has not suffered so severely from this disease as many other towns. Salford, Norwich, Huddersfield, and Manchester, shew the highest mortality from it.

At the close of 1886, Measles prevailed in the Borough very extensively, and continued to increase during the first quarter of 1887; rapidly declined towards the end of the second quarter, and almost disappeared from the mortality returns during the fourth quarter of the year.

1st Qr.	2nd Qr.	3rd Qr.	4th Qr.
53 deaths.	28 deaths.	5 deaths.	1 death.

Early in February, a large number of handbills were distributed, with the sanction of the Sanitary Committee, in those districts and parts of the town where the disease was known most to prevail, giving brief and simple instructions for checking its spread and diminishing its fatality.

TABLE XIV.

Shewing the Number of Deaths from the principal Zymotic Diseases in the Ten Years, 1877 to 1886, and in the Year 1887.

DISEASE.	1877	1878	1879	1880	1881	1882	1883	1884	1885	1886	Annual Average of Ten Years, 1877-1886.	Proportion of Deaths to 1000 Deaths in Ten Years, 1877-1886.	Total Deaths in 1887.	Proportion of Deaths to 1000 Deaths in 1887.
Small Pox	6	1	0	0	2	5	3	0	0	0	1'7	0'63	0	0
Measles	40	45	72	166	7	74	15	57	52	43	57'1	21'4	87	31'9
Scarlet Fever	33	12	105	119	184	72	91	63	113	44	83'6	35'1	5	1'8
Diphtheria	9	5	11	23	11	5	6	11	14	4	9'9	37'2	13	4'7
Whooping Cough	65	82	61	27	122	19	59	66	52	27	58'0	21'8	55	20'2
Fever { Typhus	0	0	0	0	0	0	0	0	0	0	0	0	0	0
{ Enteric	20	31	21	46	29	19	10	16	36	19	24'7	9'2	31	11'3
{ Simple continued.....	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Diarrhoea	185	302	88	398	193	214	148	344	186	256	231'4	86'9	247	90'7
Totals	358	478	358	779	548	408	332	557	453	393	466	175	438	160

Scarlet Fever.—Only ^{six}~~four~~ deaths were caused by Scarlatina. One must go back for more than twenty years to find so low a record of scarlatinal mortality in Leicester as this. During the last ten years, only once has anything like so low a number been registered, that being in 1878, when 12 deaths only took place. (See Table XIV.) The average number recorded in the ten years ending 1886 has been 83.

Diminished
mortality from
Scarlet Fever.

In the country at large, the deaths from Scarlet Fever shew an increase on the two preceding years. In the twenty-eight large towns the death rate this year from this disease has been 0·39 per 1000, whilst in Leicester it was only 0·03.

The number of persons who were *ill* of Scarlet Fever during the year is seen in Table XIII. to have been only 272, as against 817 in the previous year.

TABLE XV.

Deaths from Scarlatina during each Lunar Month of the following Years.

Year.	I.	II.	III.	IV.	V.	VI.	VII.	VIII.	IX.	X.	XI.	XII.	XIII.	Total.
1879	0	1	4	1	4	2	1	7	13	20	15	19	20	107
1880	12	7	4	13	6	7	3	4	12	5	16	12	17	118
1881	12	6	9	6	7	11	18	18	31	24	19	19	12	192
1882	6	12	5	2	2	2	2	2	3	9	11	7	8	71
1883	4	2	3	3	8	7	6	3	5	5	12	15	18	91
1884	8	12	5	2	7	5	2	3	4	2	3	5	5	63
1885	2	10	5	6	3	9	4	14	9	15	10	10	16	113
1886	9	11	2	4	2	0	0	1	3	2	2	4	4	44
1887	2	0	1	2	0	0	0	0	0	0	0	0	0	5

Table XV. shews the distribution throughout each of the last nine years of scarlatinal deaths, and it will be observed that last year, after the fourth month, *no death took place*. It is satisfactory to be able to report that the comparative freedom of the Borough from Scarlet Fever still continues.

TABLE XVI.

Shewing Mortality at different ages of persons suffering from Scarlet Fever.

	1887.				1886.				1885.			
	No. of Patients.	Deaths.	Death-rate per cent.	No. of Patients.	Deaths.	Death-rate per cent.	No. of Patients.	Death-rate per cent.	No. of Patients.	Deaths.	Death-rate per cent.	No. of Patients.
Under 1 year	10	0	0	35	5	14.3	24	14.3	24	6	25.0	24
1 to 2 years	16	1	6.2	58	6	10.3	174	10.3	174	30	17.2	174
2 to 3 ..	33	0	0	49	9	18.3	242	18.3	242	25	10.3	242
3 to 4 ..	37	2	5.1	98	5	5.1	276	5.1	276	16	5.8	276
4 to 5 ..	40	1	2.5	90	5	5.5	217	5.5	217	13	5.9	217
5 to 6 ..	33	1	3.0	86	6	6.9	219	6.9	219	6	2.7	219
6 to 7 ..	16	0	0	75	2	2.6	152	2.6	152	5	3.2	152
7 to 8 ..	13	0	0	92	3	3.2	143	3.2	143	3	2.1	143
8 to 9 ..	9	0	0	32	2	6.2	90	6.2	90	3	3.3	90
9 to 10 ..	9	0	0	41	0	0.0	58	0.0	58	2	3.4	58
Over 10 years	53	0	0	155	1	0.6	206	0.6	206	4	1.9	206
Ages not stated	3	0	0	6	0	0.0	15	0.0	15	0	0	15
Totals	272	5	1.8	817	44	5.4	1816	5.4	1816	113	6.2	1816

In accordance with last year, the following Table (Table XVI.) is inserted, shewing the ages of all those who were known to have passed through an attack of this disease in 1887.

Diphtheria.—Eighty-one persons have been reported as suffering from Diphtheria, of whom thirteen died. Both the attacks and the deaths shew an increase on the previous year's returns. The death rate per 1000 equals 0·09. This rate in the twenty-eight large towns, last year, was 0·18 per 1000, whilst in London it again shewed a marked excess, being equal to 0·23 per 1000. In the twenty-seven large provincial towns it was 0·13 per 1000, so that with these Leicester compares favourably.

Whooping-cough.—Like Measles, Whooping-cough last year caused double the number of deaths of 1886. Fifty-five deaths were recorded, giving a death rate of 0·38 per 1000 per annum.

The average number of these deaths in the Borough, during the preceding ten years, has been 58, and the average annual death rate 0·45 per 1000; so that 1886 does not stand out as a pre-eminently bad year, and is considerably below the average of the twenty-eight large towns, where the death rate last year was 0·62 per 1000. Throughout the country generally Whooping-cough shewed a decrease on the decennial average.

If more attention were paid by mothers to the proper nursing, and especially to the keeping of a child suffering from this disease in an equable temperature, unexposed to draught and cold, much of the mortality from this disease might be avoided.

Contrary to Measles, Whooping-cough increased in fatality from the first to the fourth quarter of the year, and at the time of writing is still very prevalent in the town.

1st Qr.	2nd Qr.	3rd Qr.	4th Qr.
10 Deaths.	10 Deaths.	12 Deaths.	27 Deaths.

Increased
number of
Deaths from
Whooping-
cough.

Increase of
Fever in 1887.

Fever.—One of the most unsatisfactory features of this year's report is the increased mortality to be recorded from Fever. These deaths may nearly all be attributed to Typhoid Fever, as Leicester is one of those fortunate communities which is *absolutely free*, and has been for many years, from *Typhus* Fever. Thirty-one deaths were recorded, as against nineteen only in the preceding year.

Two hundred and twenty-two persons were reported as having *suffered* from this disease, giving a death rate of persons attacked of about 14 per cent.

The death rate per 1000 of the population, last year, equals 0·22, as against 0·19, the average of the preceding ten years.

The number of deaths in the past ten years have averaged about 25, varying from ten in 1883 to forty-six in 1880. (See Table XIV.)

The death rate from Typhoid, throughout the country generally, was last year 0·20 per 1000, one of the lowest yet recorded, whilst in the twenty-seven large provincial towns it averaged as high as 0·26 per 1000.

Diarrhœa.—The statistics relating to this disease, for the past year, are briefly as follows:—Two hundred and forty-seven deaths were caused by it, of which 232 occurred during the three months ending Sept. 29th. The average annual number during the last ten years has been 231. The death rate last year was 1·72 per 1000 of the population per annum, as against 1·84 for the previous ten years. During this time the annual number has varied from 88 in 1870 to 308 in the following year, 1880 (see Table XIV.); so that, compared with former years, the one just gone does not stand out as a very black one.

Compared with the rest of the country and with the other large towns, Leicester of course comes out badly.

In the twenty-eight large towns the death rate from this disease was 0·97 per 1000. Salford, with a population of 218,658 persons, had 327 deaths, or a rate of 1·4 per 1000; whilst Preston, whose fatality from this disease was even greater than Leicester, had a rate of 2·2 per 1000, or 231 deaths in a population of 102,238.

On the map inserted in the Appendix to this Report will be found the exact locality of each death indicated by a black cross, and it is there seen at a glance how very largely these are contained in the area coloured pink thereon.

In the first part of this Report this disease has been discussed at some length (see page 17); it may, however, again be pointed out how, from the information obtained in the gratuitous distribution of diarrhœa mixture, during the prevalence of the disease, it is proved beyond the possibility of doubt that it is not *infants only*, or *chiefly*, who are attacked, but that the disorder prevails extensively throughout the community at large; but because it is the former who principally die from it, many observers in past years, in endeavouring to throw light upon its causation, have failed to recognize this fact, having had chiefly to rely, for their statistical information, upon the mortality returns of any given district amongst which infantile deaths almost exclusively are found.

Diarrhœa not
confined to
Infants and
Children.

Number and Ages of Patients suffering from Diarrhœa in the Summer of 1887, to whom Medicine was supplied gratuitously.

Under 1 year	578	5 years to 6	129	10 years to 20	1127
1 year to 2	922	6 „ to 7	137	20 „ to 60	5201
2 „ to 3	357	7 „ to 8	120	Over 60 years	705
3 „ to 4	213	8 „ to 9	142		
4 „ to 5	175	9 „ to 10	98	Total all ages	9904

Erysipelas.—The number of deaths from Erysipelas, during the past year, was ten, whilst the number of persons reported as suffering from this disease was 308. In the preceding year there were 258 cases, with five deaths; so that there has been some increase both in the prevalence and in the mortality from this ailment. It should, however, be clearly understood, that very few of the above 308 persons have been the subjects of any serious attack of this disease, a very large proportion of the cases being of the slightest and most fugitive description, often accompanying or following some wound or injury; and in many other instances patients have been found liable to periodically suffer from this ailment.

Trivial
character of
many cases of
Erysipelas.

The other deaths in the zymotic group call for no special mention: amongst them were seven from Syphilis, five from Pyæmia and Septicæmia, and two from Puerperal Fever.

CLASSES II. and III.—PARASITIC and DIETIC DISEASES.

In these groups only three deaths find a place this year, one being from starvation and two from alcoholism; but although only two are thus recorded as due to the effects of alcohol, the number due to diseases *the direct result of excessive use* of alcoholic drinks, would, if they could be accurately put together, form a by no means insignificant total. Most of these find their way into the various diseases of liver, kidneys, and nervous system.

Deaths from
Alcohol.

CLASS IV.—CONSTITUTIONAL DISEASES.

In this group 309 deaths are placed, 104 males and 205 females. Although no age or period of life is exempt from the incidence of these constitutional deaths, from 20 to 40 years of age furnishes the largest proportion, 124 persons between those ages having died from diseases referred to in this group. (See tabulated record of deaths, in Appendix.)

TABLE XVII.

Shewing the Deaths at all ages during 1887, from certain groups of Diseases, and proportion to 1000 of population, and to 1000 Deaths from all causes; also the Number of Deaths of Infants under one year of age from other groups of Diseases and proportion to 1000 Births, &c.

DIVISION I. (All ages.)		Total Deaths.	Deaths per 1000 of Population at all ages.	Deaths per 1000 of Total Deaths at all ages.
1.	Zymotic Diseases	462	3.2	160
2.	Pulmonary Diseases (Excluding Phthisis.)	495	3.4	181
3.	Principal Tubercular Diseases (Including Phthisis.)	247	1.7	90
DIVISION II. Infants under one year.		Total Deaths.	Deaths per 1000 of Births.	Deaths per 1000 of Total Deaths under one year.
4.	Wasting Diseases (Includes Tabes Mesenterica.)	239	50.9	230
5.	Convulsive Diseases	128	27.2	126

In this class are placed the deaths from Phthisis and other forms of Tuberculosis, and deaths from cancerous diseases. Tuberculous diseases, including Phthisis, caused 247 deaths, as against 252 in 1886. To various forms of Cancer were attributed 80 deaths, as against 63 in the preceding year.

CLASS V.—LOCAL DISEASES.

No less than 1213 deaths were caused by diseases included under this heading, or more than 44 per cent. of all the deaths of the year. In 1886, 1254 deaths were ascribed to the same causes, the principal of which are as follows :—Diseases of Brain and Nervous System, 361, including 171 from Convulsions, a large proportion of which are infants under one year of age (see Table XVII.); Diseases of Heart and Blood-vessels, 196; and Diseases of Respiratory Organs, 495 (see Mortality Tables in Appendix).

TABLE XVIII.

Distribution, in the different Wards, of deaths from six important groups of disease.

	Six Chief Zymotic dis.	Diarrhoea.	Devel-opm'l.	Acute Resp'ratory.	Phthisis.	Convulsions.
1 St. Martin's Ward..	2	2	2	3	0	1
2 N. Margaret's „ „	14	28	51	46	14	20
3 M. „ „ „	41	54	123	124	53	38
4 E. „ „ „	51	63	166	135	64	47
5 E. Mary's „ „	9	5	14	24	9	6
6 W. „ „ „	46	51	84	87	33	34
7 All Saints' „ „	28	42	74	61	19	22

N.B.—The mortality of the fourth, or East St. Margaret's Ward, is a little over-stated, as owing to the absence of the necessary information, the deaths in the workhouse, which is situate in this Ward, cannot be distributed to the districts from whence the patients came.

The ages at which this group of deaths is most fatal are at the extremes of life, the young under five years and those aged sixty years and upwards.

CLASS VI.—DEVELOPMENTAL DISEASES.

529 deaths were caused by the various diseases in this group, as against 575 in the preceding year. Premature Birth is responsible for 99 of these deaths, Atrophy and Debility for 230 the bulk of these being children under one year of age, and 171 were ascribed to old age. In 1886, 175 deaths were attributed to old age, and 164 in 1885.

In Table XVIII. is given the deaths in the different wards of the Borough, from several important groups of diseases.

CLASS VII.—DEATHS FROM VIOLENCE.

Accidental deaths, such as those from Drowning, Poisoning, Wounds, Suffocation, Burns, and other forms of violence, were 81 in number, and included four cases of Manslaughter, one of murder, eleven of suicide, and one judicial execution. They form about 2.9 per cent. of the total deaths of the year.

CLASS VIII.—ILL-DEFINED and UNSPECIFIED CAUSES.

Thirty-five deaths were registered from causes so vague, &c., as not to permit of them being placed in either of the preceding groups, and include "death from natural causes," hæmorrhage, dropsy, mortification, tumour, &c., &c.

Inquests.—There have been 304 deaths during the past twelve months in which it was deemed necessary to hold an enquiry as to the cause, or other circumstances connected therewith. Amongst these are included all those deaths which were due to the various forms of violence, whilst the remainder consist chiefly of those in which no medical man was in attendance, or being only in attendance shortly before death occurred, did not feel justified in certifying as to the cause. The proportion of inquests to the total number of deaths was last year 11·1 per 100. In the twenty-eight large towns it was 6·5 per 100.

Although the proportion of inquest cases is in Leicester very high, it is better this should be so than that the uncertified deaths should be allowed to increase in number.

Uncertified Deaths.—Seventy-two deaths were registered during 1887 which were uncertified by either coroner or medical man, the statements of the friends of the deceased being accepted by the registrar, or the coroner deciding that an inquest was unnecessary. This is a larger number than in either of the two preceding years, and is equal to about two and a half per cent. of all the deaths. A large proportion of these deaths were of infants prematurely born. In the other large towns it was equal to 2·3 per cent., varying from 1·0 in Portsmouth to 7 per cent. in Halifax.

Increase of
Uncertified
Deaths.

ANALYST'S REPORT.

BOROUGH ANALYST'S LABORATORY,
TOWN HALL, LEICESTER,
March, 1888.

To the Sanitary Committee.

GENTLEMEN,

I beg to submit to you my second report as Public Analyst to the Borough, and to furnish the following details respecting the proceedings taken to prevent the adulteration of food, &c., under the Provisions of the "Sale of Food and Drugs Act, 1875."

TABLE I.

Articles of Food and Drugs, analyzed under the provisions of the "Sale of Food and Drugs Act," during the Year 1887.

Commodity Analyzed.	Number of Samples obtained.	Number of Genuine Samples.	Number of Adulterations.	Remarks.
Milk	83	74	9	Five prosecutions: fines, 20 -, 10 -, 10 -, 10 -, 10 -, with costs, were inflicted in the various cases. In four cases the offenders were brought before the Sanitary Committee and cautioned.
Butter	15	13	2	
Bread	12	12	0	Two prosecutions, one fined 20 - and costs, in the other case, owing to a reasonable excuse, the costs only were inflicted.
Flour	12	12	0	
Vinegar ..	6	5	1	One cautioned by Sanitary Committee.
Coffee	5	5	0	
Beer	4	4	0	One fined £5 and costs, one 40 - and costs, in the other case the prosecution was withdrawn.
Spirits	4	1	3	
Lard	4	4	0	One sample very dirty and inferior in quality.
"Quinine Cup"	1	0	1	
Total	146	130	16	This was a wooden cup sold as a "quinine cup." It contained no quinine and was simply made from a piece of quassia wood. No action was taken.

The number of samples submitted to me for analysis have been 146, of which six were from private sources. The preceding table furnishes details of the various articles :—

From the above it will be seen that more than one-half of the total have been samples of milk. This article being one of the prime food stuffs, and one which so easily lends itself to fraudulent manipulation, it is necessary to keep a constant, vigilant watch upon it, the more so as it forms so important an article of food for infants and invalids. It is satisfactory to be able to point to a reduction in the per centage of adulterated milks, as compared with the previous year, *i.e.*, 10·8 per cent., as against 17·4. It is not, however, to be thought that all the remainder were absolutely pure and unsophisticated.

Milk is, of all substances, perhaps the most unsatisfactory to report upon in the present state of the law, there being no standard fixed by which analysts are to be guided. The standard adopted by the Society of Public Analysts of 9 per cent. total solids, not fat, is often disputed, though the results of many thousands of analyses have proved this to be a fair one.

Undoubtedly under certain conditions, or when not in normal health, a cow may yield a poorer milk than this. It is a question worthy of consideration, however, whether, when milk is found below the average quality of a pure milk, the onus of proving its genuineness should not be thrown upon the seller. In some large towns, a method has been adopted by which a standard is supplied to the analyst, whereby he can at once state whether a milk has been tampered with or not. It is this :

When a sample is found to be below the *average* quality, the seller is at once informed that his milk is not satisfactory, the source from whence it came is ascertained, and an inspector, without loss of time, visits the place where the cows are kept which were stated to furnish the said sample. He sees the cows milked, and obtains a second sample, which he has thus seen taken direct from the cow, and the analyst can from this at

once state with absolute certainty to what extent, if any, the first sample had been tampered with.

This is a perfectly fair and just method, because the milk yielded by any particular cow, or number of cows, would vary scarcely at all from one day to the next.

In this matter of milk adulteration, England is far behind some other countries ; in the state of Massachusetts, U.S.A., for instance, the penalties for selling milk adulterated, or "*of inferior quality*," are for a first offence £10 to £40, for the second £20 to £60, and for any subsequent offence a fine of £10 and *imprisonment* for from sixty to ninety days.

An important legislative enactment respecting adulterated butter is now in force in England and Wales, and though it will not entirely prevent the sale of butter substitutes under the name of butter, it makes it more difficult for offenders to escape, and makes the penalties following conviction heavier.

TABLE II.

Number of Samples Analyzed and proportion of Adulterated Articles in 1887, and in the six previous years.

Year.	Number of Samples Analyzed	Number of Samples Adulterated.	Per Centage of Samples Adulterated.	Number of Prosecutions.	Per Centage of Adulterated Samples in the following articles.			
					Milk.	Butter.	Spirits.	Groceries
1887	146	16	11·0	10	10·8	13·3	75·0	6·6
1886	168	25	14·8	9	17·4	17·6	20·0	28·4
1885	87	0	0·0	0	0·0	0·0	0·0	0·0
1884	96	4	4·2	4	6·4	0·0	22·2	0·0
1883	138	10	7·2	4	8·9	0·0	22·2	17·6
1882	130	1	0·8	1	0·0	0·0	0·0	25·0
1881	131	7	5·3	6	12·0	0·0	0·0	10·0

WATER ANALYSIS.

During the past year forty-five samples of water from wells, in various parts of the Borough, have been submitted to me for

analysis. Of these nineteen were so polluted as to be unsafe for drinking purposes: they were all condemned, and the wells closed by order of the Sanitary Committee, and a supply from the town mains substituted for them.

It is estimated that there are at present, within the Borough, about 332 wells, from which 699 houses, or 3500 persons, obtain their water supply. Most of these have at one time or other been subjected to examination, but it not unfrequently happens that water, which at one time was passed as pure, has, from some of the many causes always at work in the centre of a large and crowded community, been subsequently found to have become contaminated.

The water supplied by the Corporation has been regularly analyzed during the year. Following upon the prolonged dry weather of last summer and autumn, the rainfall having been less in England than for thirty years past, the quantity of water in the reservoirs became dangerously low, and not of the same high quality as regards purity which has hitherto usually characterized it. At the close of the year, the supply from the Thornton Reservoir contained so large a proportion of both free and albumenoid ammonia, that what little water remained in it was allowed to run away, and the bed of the reservoir partially cleaned out, with a beneficial result.

I am, Gentlemen,

Your obedient servant,

HENRY TOMKINS, B.Sc.,

Public Analyst.

A P P E N D I X .

METEOROLOGICAL RETURNS.

Births, Deaths, and Mortality from Zymotic Diseases, &c., for each week in 1887.

Week.		Thermometer.							Deaths.			Deaths from									
No.	Date of ending.	Highest.	Lowest.	Mean.	Humidity Mean.	Rainfall.	Wind veloc. miles average per day.	Barometer Mean.	Births.	Deaths.			Small Pox.	Scarlet Fever.	Measles.	Diphtheria.	W. Cough.	Fever.	Diarrhea.	Respiratory.	Phthisis.
										All ages.	Under 5.	Over 5.									
1	Jan. 8	39.0	16.2	30.3	92	1.88	133.6	29.120	96	64	35	29	...	2	...	...	...	...	...	16	8
2	" 15	38.6	16.2	31.9	94	0.22	134.0	30.031	78	66	32	34	...	1	7	1	...	...	...	12	5
3	" 22	47.8	16.0	34.3	91	0.45	157.8	31.219	88	51	19	32	...	1	2	...	1	...	...	11	1
4	" 29	53.0	35.0	41.7	91	0.02	210.8	30.306	104	52	21	31	...	...	1	1	1	...	1	13	3
5	Feb. 5	54.0	30.2	44.4	89	0.36	283.5	30.041	93	50	14	36	...	...	1	...	7	1	1	11	7
6	" 12	45.6	23.5	33.7	87	..	145.1	30.652	100	40	18	22	...	...	2	...	...	...	...	10	3
7	" 19	50.0	23.0	35.4	94	0.16	122.4	30.323	99	48	26	22	...	...	2	...	1	...	...	14	1
8	" 26	53.0	31.0	43.3	81	0.06	210.9	29.898	82	56	36	20	...	...	10	...	...	...	...	16	5
9	Mar. 5	55.0	24.0	37.0	88	0.04	78.5	30.527	79	52	27	25	...	1	2	1	...	...	...	16	6
10	" 12	48.0	30.5	37.8	89	0.41	119.9	30.118	81	59	32	27	...	...	6	...	3	...	1	15	6
11	" 19	41.0	21.0	32.3	84	0.03	101.3	30.081	76	55	28	27	...	...	6	...	3	...	...	14	4
12	" 26	52.0	26.7	40.6	85	0.97	225.4	29.624	87	65	30	35	...	...	7	2	...	3	...	20	9
13	April 2	56.1	31.5	45.3	79	0.38	180.9	30.042	101	54	30	24	...	...	5	...	...	2	...	14	4
14	" 9	55.4	30.0	42.2	73	0.04	242.5	29.959	92	62	30	32	...	1	+	...	+	...	...	10	2
15	" 16	59.1	30.1	42.1	79	..	179.0	30.232	93	59	30	29	...	...	2	...	1	...	1	12	5
16	" 23	61.5	45.0	48.4	71	0.06	183.8	30.045	106	41	17	24	...	...	4	...	1	...	...	+	3
17	" 30	54.2	29.0	42.9	77	0.84	163.3	29.795	86	40	20	20	...	...	3	...	1	...	...	8	1
18	May 7	59.4	29.8	45.5	82	0.38	130.7	29.829	98	48	22	26	...	...	2	1	...	...	...	10	2
19	" 14	69.0	36.5	50.9	76	0.17	155.7	30.004	94	43	19	24	...	...	1	...	...	...	...	8	5
20	" 21	60.0	34.5	48.4	81	0.77	215.9	29.895	80	38	18	20	...	...	+	...	2	...	...	+	3
21	" 28	59.0	37.5	48.8	78	0.54	192.1	30.069	84	47	22	25	...	...	...	...	2	...	...	8	3

22	June	4	67.5	40.0	49.8	87	1.60	179.8	29.920	78	39	23	16	...	3	...	...	...	9	4
23	"	11	72.5	46.0	59.3	70	0.07	155.7	30.136	104	29	14	15	...	...	...	...	...	4	4
24	"	18	80.0	51.0	64.7	60	..	91.4	30.251	89	41	24	17	...	4	...	...	...	8	4
25	"	25	79.0	43.0	59.3	67	..	163.6	30.317	81	45	17	28	...	1	...	...	...	4	5
26	July	2	81.0	44.0	62.6	71	..	72.2	30.294	87	38	23	15	...	...	...	3	...	4	1
27	"	9	84.0	44.1	65.8	60	0.31	119.2	30.022	87	60	44	16	...	...	1	...	20	7	1
28	"	16	79.5	52.3	66.6	71	0.05	173.4	29.917	118	82	57	25	...	...	...	32	3	3	3
29	"	23	79.8	42.5	62.0	73	0.03	91.4	30.203	105	88	65	23	...	...	...	45	7	4	4
30	"	30	76.0	53.0	64.5	73	0.27	188.5	29.830	101	72	52	20	...	1	1	...	33	2	+
31	Aug.	6	84.0	42.0	61.7	71	0.01	78.4	30.211	80	73	48	25	...	...	...	31	+	3	6
32	"	13	80.5	48.5	60.6	76	0.10	108.4	30.047	93	66	41	25	...	...	1	23	+	3	6
33	"	20	70.7	40.0	57.3	71	0.05	93.1	29.899	99	50	28	22	...	1	...	11	3	+	3
34	"	27	81.3	41.8	62.5	64	0.29	101.9	29.945	76	50	25	25	...	...	2	8	6	3	3
35	Sept.	3	77.0	51.8	60.5	79	1.07	259.1	29.536	88	62	33	29	...	...	2	10	1	5	+
36	"	10	67.1	47.3	57.6	75	0.85	187.1	29.820	80	51	22	29	...	...	1	10	5	+	2
37	"	17	63.2	44.3	52.8	82	0.57	133.6	29.742	90	47	23	24	...	...	1	3	+	2	+
38	"	24	63.0	43.5	52.9	82	..	91.9	30.419	95	34	15	19	...	...	...	3	+	1	1
39	Oct.	1	62.6	32.3	48.5	89	0.01	107.6	29.743	104	47	17	30	...	...	1	3	7	5	+
40	"	8	58.6	41.0	51.3	79	0.03	64.9	30.220	75	46	27	19	...	...	1	1	9	2	2
41	"	15	49.8	30.0	42.7	85	0.37	136.7	29.731	76	39	22	17	...	...	...	1	7	2	2
42	"	22	57.0	24.0	42.0	91	0.03	83.6	30.510	99	55	22	33	...	1	3	2	11	+	0
43	"	29	56.4	25.2	42.6	77	1.50	200.6	30.098	85	36	16	20	...	...	...	...	8	6	6
44	Nov.	5	51.0	36.0	45.6	84	0.88	236.5	29.164	89	42	20	22	...	...	1	...	9	6	6
45	"	12	53.2	36.3	44.8	90	0.49	144.6	29.849	90	46	15	31	...	...	1	...	5	5	5
46	"	19	45.0	22.5	35.5	83	0.03	86.9	29.896	107	40	18	22	...	...	2	1	9	6	6
47	"	26	50.8	27.4	37.9	92	0.13	129.0	29.759	91	36	12	24	...	...	1	...	8	5	5
48	Dec.	3	49.3	33.5	42.8	91	0.21	170.0	29.976	82	52	17	35	...	...	1	2	12	5	5
49	"	10	54.0	27.0	38.7	86	0.39	183.8	29.607	93	54	30	24	...	...	3	2	16	8	8
50	"	17	50.8	28.5	40.6	91	0.60	222.2	29.607	73	60	36	24	...	...	5	1	17	1	1
51	"	24	41.0	23.5	34.7	91	0.25	110.7	29.703	85	82	35	47	...	...	2	1	22	6	6
52	"	31	39.0	24.8	32.2	89	0.14	84.8	29.959	84	71	41	30	...	...	1	6	22	3	3

DIARRHŒA

Deaths during the year ending 31st December, 1887.

ARRANGED INTO WARDS.

	No. of Deaths.		No. of Deaths.		No. of Deaths.
WARD I.					
East-gates ..	1	Cranbourne Street ..	3	Maynard Street ..	2
		Christow Street ..	1	Northampton Street ..	2
		Denmark Street ..	1	Newby Street ..	1
		Dorset Street ..	1	Nelson Place ..	1
		Denman Street ..	1	Ooeupation Road ..	1
		Elm Street ..	1	Roslyn Street ..	1
		Gresham Street ..	2	Southampton Street ..	1
Buttclose Lane ..	1	Hill (upper) Street ..	3	Sherrard Street ..	1
Charlotte Street ..	3	Kenyon Street ..	2	St. Saviour's Road ..	3
Crane Street ..	1	Lewin Street ..	3	St. Stephen's Road ..	1
Cumberland Street ..	1	Liggins Street ..	1	Stoughton Street ..	1
Garfield Street ..	1	Liverpool Street ..	2	Union ..	7
Gravel Street ..	2	Milton Street ..	1	Yeoman Street ..	1
Lower Church Gate ..	2	Neale Street ..	1	Worthington Street ..	1
Mansfield Street ..	2	Palmerston Street ..	4	Woodhill ..	1
New Road ..	1	Paradise Lane ..	1		
New Lane ..	1	Russell Street ..	1		
Old Mill Lane ..	2	Rodney Street ..	1		
Osborne Street ..	1	Willow Street ..	4		
Pasture Lane ..	3	Wheat Street ..	1		
Royal East Street ..	1	Wharf Street ..	1		
Rayns Street ..	2	Woodboy Street ..	1		
Sanvey Gate ..	1	Spinner Street ..	1		
Watling Street ..	1	Metcalf Street ..	1		
		</			

DIARRHŒA (continued).

No. of Deaths.	No. of Deaths.	No. of Deaths.
Craven Street .. 1	Redcross Street .. 2	Highcross Street .. 3
Carlisle Street .. 1	Rudkin Street .. 2	Long Lane .. 1
Deacon Street .. 1	Ridley Street .. 1	Northgate Street .. 1
Filbert Street .. 1	Trinity Hospital .. 1	Pingle Street .. 1
Grange Lane .. 1	Talbot Lane .. 2	St. Peter's Lane ... 3
Garton Street .. 1	Thorpe Street .. 1	St. Leonard's Street 1
Great Holme Street 1	West Bridge Street 1	White Street .. 1
Havelock Street .. 1	—	Warrington Street .. 1
Harding Street .. 1	Total 59	—
Henshaw Street .. 3		Total 34
Hazel Street .. 2	WARD VII.	
Jewrywall Street .. 2	All Saint's Road .. 5	
Kate Street.. .. 1	Alexander Street .. 1	TOTALS.
Laxton Street .. 1	Alexandra Street .. 1	
Latimer Street .. 1	Alice Street.. .. 1	
Little Holme Street 2	Bakehouse Lane .. 2	
Mill Lane 2	Black Friar's Street 2	
New Bridge Street.. 2	Crystal Street .. 1	
Noble Street .. 1	Emerald Street .. 2	
Oxford Street .. 2	Fuller Street .. 1	
Outram Street .. 1	Frog Island 3	Ward I. ... 1
Pentonville Street .. 1	Friars' Causeway .. 2	Ward II. .. 26
Poplar Avenue .. 1	High Street.. .. 1	Ward III. .. 66
		Ward IV. .. 48
		Ward V. .. 13
		Ward VI. .. 59
		Ward VII. .. 34
		Total 247

ENTERIC FEVER.

WARD I.		WARD IV.		WARD VII.	
Nil.		Charles Street .. 2		Alexander Street .. 1	
		Charwood Street .. 1		All Saints' Road .. 1	
		Guthlaxton Street .. 1		Bradgate Street .. 1	
WARD II.		Lee Street 1		Emerald Street .. 1	
Abbey Street .. 1		Queen Street .. 1		Northgate Street .. 2	
Burley's Lane .. 1		Richard Street .. 1		Sarah Street.. .. 1	
Craven Street .. 1		Southampton Street 1		—	
—		—		Total 7	
Total 3		Total 8			
		WARD V.		TOTALS.	
WARD III.		Nil.		Ward I. .. 0	
Argyle 1		WARD VI.		Ward II. .. 3	
Belgrave Gate .. 2		Fosse Road.. .. 1		Ward III. .. 7	
Birstall Street .. 1		Hazel Street .. 1		Ward IV. .. 8	
Braudon Street .. 1		Infirmery 1		Ward V. .. 0	
Dorset Street .. 1		Jarrom Street .. 1		Ward VI. .. 6	
Liverpool Street .. 1		Noble Street .. 1		Ward VII. .. 7	
—		Walnut Street .. 1		—	
Total 7		—		Total 31	
		Total 6			

SCARLET FEVER.

	No. of Deaths.		No. of Deaths.		No. of Deaths.
WARD I.		WARD IV.		WARD VII.	
Nil.		Nil.		Nil.	
WARD II.		WARD V.		TOTALS.	
Nil.		Nil.		Ward I.	.. 0
WARD III.		WARD VI.		Ward II.	.. 0
Crab Street ..	.. 1			Ward III.	.. 4
Dorset Street ..	.. 1			Ward IV.	.. 0
Lower Grove Street	.. 1			Ward V.	.. 0
Martin Street ..	.. 1	Peacock Lane ..	.. 1	Ward VI.	.. 1
Total 4		Total 1		Ward VIII.	.. 0
				Total 5	

MEASLES.

WARD I.		WARD IV.		Foxon Street ..	.. 1
Market Place ..	.. 1	Baker Street ..	.. 1	Gray Street ..	.. 3
Total 1		Biddulph Street ..	.. 1	Harding Street ..	.. 1
WARD II.		Cedar Road ..	.. 1	Knighton Street ..	.. 1
Archdeacon Lane ..	.. 1	Donnington Street ..	.. 1	Leamington Street ..	.. 1
Craven Street ..	.. 1	Flint Street ..	.. 1	Latimer Street ..	.. 1
Church Gate ..	.. 1	George Street ..	.. 2	Middle Street ..	.. 1
Friday Street ..	.. 1	Guthlaxton Street ..	.. 2	Mill Lane ..	.. 1
Garfield Street ..	.. 1	Gartree Street ..	.. 1	New Park Street ..	.. 2
Leadenhall Street ..	.. 1	Halford Street ..	.. 1	New Bridge Street ..	.. 1
Maxfield Street ..	.. 1	Humberstone Gate ..	.. 2	Oxford Street ..	.. 2
Rayns Street ..	.. 1	Medway Street ..	.. 1	Southgate Street ..	.. 1
Sandacre Street ..	.. 1	Northampton Street	.. 1	St. Nicholas Street ..	.. 1
Total 9		Roslyn Street ..	.. 1	Thornton Lane ..	.. 2
		Swaffham Street ..	.. 1	Total 29	
WARD III.		St. Stephen's Road	.. 1	WARD VII.	
Argyle Street ..	.. 2	Upper Charnwood St.	.. 1	Emerald Street ..	.. 1
Belgrave Gate ..	.. 1	Slawson Street ..	.. 1	Friars' Causeway ..	.. 1
Brook Street ..	.. 1	Total 20		Pingle Street ..	.. 1
Birkley Street ..	.. 1	WARD V.		Ruding Street ..	.. 1
Brandon Street ..	.. 2	Albion Hill ..	.. 1	White Street ..	.. 1
Britannia Street ..	.. 2	Dover Street ..	.. 2	Total 5	
Cranbourne Street ..	.. 2	Total 3		TOTALS.	
Carley Street ..	.. 1	WARD VI.		Ward I.	.. 1
Eaton Street ..	.. 1	Bonner's Lane ..	.. 1	Ward II.	.. 9
Gresham Street ..	.. 2	Braunstone Gate ..	.. 2	Ward III.	.. 20
Grosvenor Street ..	.. 1	Cranmer Street ..	.. 1	Ward IV.	.. 20
Pike Street ..	.. 1	Chestnut Street ..	.. 1	Ward V.	.. 3
Paradise Row ..	.. 1	Catesby Street ..	.. 2	Ward VI.	.. 29
Wharf Street ..	.. 2	Dun's Lane ..	.. 2	Ward VII.	.. 5
Total 20		East Bond Street ..	.. 1	Total 87	

WHOOPING COUGH.

	No. of Deaths.		No. of Deaths.		No. of Deaths.
WARD I.		Donnington Street	1	Hazel Street	1
Cheapside ..	1	Humberstone Road	1	Mill Lane ..	1
		London Road ..	1	Norfolk Street ..	1
		Midland Street ..	1	New Park Street ..	2
Total 1		Nelson Place ..	1	New Bridge Street	1
WARD II.		Sparkenhoe Street ..	1	Orton Street ..	1
Garfield Street ..	1	Sussex Street ..	1	Poplar Avenue ..	1
Navigation Street ..	1	Stoughton Street ..	1	Ridley Street ..	1
Royal Kent Street..	1	Twycross Street ..	1	Thorpe Street ..	1
		Underhill Street ..	1		
Total 3		Worthington Street	1	Total 18	
WARD III.		Total 14		WARD VII.	
Belgrave Gate ..	2			Black Friar's Street	1
Belper Street ..	1	WARD V.		Blue Boar Lane ..	1
Bedford Street ..	1	Honover Street ..	1	Johnston Street ..	1
Britannia Street ..	1	St. James' Place ..	1		
Crafton Street ..	1	Wellington Street ..	1	Total 3	
Curzon Street ..	1	York Street ..	1		
Cranbourne Street ..	1			TOTALS.	
Junction Road ..	1	Total 4		Ward I. ..	1
Martin Street ..	1			Ward II. ..	3
Upper Brunswick St.	1			Ward III. ..	12
Larch Street ..	1			Ward IV. ..	14
Total 12		WARD VI.		Ward V. ..	4
WARD IV.		Albany Cottages ..	2	Ward VI. ..	18
Constitution Hill ..	1	Albert Street ..	1	Ward VII. ..	3
Colton Street ..	2	Braunstone Gate ..	3		
		Carlton Street ..	1	Total 55	
		Freemen's Common	1		

DIPHTHERIA.

WARD I.		Roslyn Street ..	1	WARD VII.	
Nil.		Station Street ..	1	Olive Hill ..	1
				Redcross Street ..	1
WARD II.		Total 6		Soar Lane ..	1
Nil.					
		WARD V.		Total 3	
WARD III.		Hastings Street ..	1		
Gresham Street ..	1			TOTALS.	
Total 1		Total 1		Ward I. ..	0
				Ward II. ..	0
WARD IV.		WARD VI.		Ward III. ..	1
Earl Howe Street ..	1	Hazel Street ..	1	Ward IV. ..	6
Farnham Street ..	2	Wellford Road ..	1	Ward V. ..	1
Midland Street ..	1			Ward VI. ..	2
		Total 2		Ward VII. ..	3
				Total 13	

5.—Venereal Diseases.

Syphilis	3	2	..	2	3	4	..	..	..	..	..	..	..	..	..	3	4	7
Gonorrhea, Stricture of Urethra .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
6.—Septic Diseases.																		
Erysipelas .. .. .	..	2	..	..	1	2	..	1	3	2	..	1	6	2	8	10		
Pyæmia, Septicæmia .. .. .	..	..	..	..	5	..	..	5	..	..	..	..	5	..	5	5		
Puerperal Fever.. .. .	..	..	..	..	2	..	..	2	..	..	..	..	2	..	2	2		
	146	123	66	51	212	174	11	8	13	9	8	6	8	2	34	42	246	462

Class II.

PARASITIC DISEASES.

Thrush and other Vegetable Parasitic Diseases.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Worms, Hydatids, and other Animal Parasitic Diseases .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..

Class III.

DIETIC DISEASES.

Want of Breast Milk, Starvation	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1
Purpura and Scurvy .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
{ a Del. Tremens	..	..	..	..	..	..	1	..	..	..	..	..	..	1	..	1	1	1
{ b Intemperance	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1

Class IV.

CONSTITUTIONAL DISEASES.

Rheumatic Fever .. .. .	..	..	..	..	..	..	..	..	1	1	..	..	..	1	3	1	3	4
Rheumatism .. .. .	..	..	..	..	..	2	..	1	1	..	2	2	..	5	5	5	10	
Gout .. .. .	..	..	..	..	..	..	..	..	1	..	1	..	..	2	2	2	2	
Cancer, Malignant Diseases .. .. .	..	..	..	..	..	..	1	3	2	7	23	19	24	29	51	29	51	80
Cancrum Oris (Noma) .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3
Rickets	2	..	1	..	3	..	..	..	..	..	..	..	..	..	..	3	..	3
Tabes Mesenterica	14	13	6	2	20	15	..	..	1	..	..	..	..	1	20	16	36	
Phthisis	1	3	1	4	2	7	9	13	56	25	21	8	..	90	94	97	191	

Deaths continued

	0 to 1.		1 to 5		Under 5		5—20		20—40		40—60		60—80		80 and upwards.		Over 5		All ages.		Total.
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
Hydrocephalus and Tubercular Meningitis	7	6	2	2	9	8	1	1	..	3	..	..	..	..	..	..	1	1	10	9	19
Other forms of Tuberculosis	11	6	6	1	17	7	1	3	3	..	2	..	1	..	..	..	6	7	23	14	37
Scrofula .. .. .	..	..	..	..	..	1	..	..	2	..	..	1	..	..	..	..	..	1	..	2	2
Anæmia, Chlorosis, Leucocythæmia	1	..	..	..	1	..	..	..	2	..	..	2	1	..	..	..	2	3	3	3	6
Diabetes .. .. .	..	..	..	..	..	..	..	..	1	..	2	3	1	..	..	..	3	4	3	4	7
Other Constitutional Diseases .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	1	1	2
Class V.	36	28	16	10	52	38	13	18	59	65	38	52	32	31	1	..	142	167	194	205	399
LOCAL DISEASES.																					
1.—Diseases of Nervous System.																					
Inflammation of Brain or Membranes	17	10	8	8	25	18	8	9	..	2	2	..	28	26	..	5	10	11	35	29	64
Apoplexy, Softening of Brain, Paralysis .. .. .	..	..	..	..	..	..	..	..	3	4	18	12	..	2	1	..	54	43	54	43	97
Insanity, General Paralysis of Insane .. .. .	..	..	..	..	..	..	..	1	1	..	2	..	..	2	..	..	3	2	3	2	5
Chorea .. .. .	..	..	..	..	1	..	..	1	1	..	..	..	..	..	..	..	1	1	1	1	2
Epilepsy .. .. .	..	..	1	1	1	..	1	1	2	2	..	1	..	..	..	..	3	3	4	3	7
Convulsions	79	49	28	12	107	61	1	1	..	..	..	1	..	..	..	..	1	2	108	63	171
Laryngismus Stridulus .. .. .	..	..	1	1	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1
Disease of Spinal Cord, Paraplegia, Paralysis Agitans .. .. .	..	..	..	..	..	..	3	..	2	1	1	..	2	..	..	..	6	1	6	1	7
Other Diseases of Nervous System .. .. .	..	1	1	1	1	1	..	..	..	..	3	..	..	..	..	..	5	..	6	1	7
2.—Diseases of Organs of Circulation.																					
Pericarditis and Endocarditis .. .. .	..	..	..	..	..	..	1	..	..	1	..	..	28	1	..	1	1	2	1	2	3
Heart Disease	2	..	..	..	2	..	7	11	13	17	40	34	..	28	1	..	89	91	91	91	182
Anæurism .. .. .	..	..	..	..	..	..	..	..	3	..	3	1	..	..	..	..	3	1	3	1	4
Embolism, Thrombosis .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Other Diseases of Blood Vessels .. .. .	..	..	1	1	1	1	..	..	1	..	1	..	2	1	1	..	6	1	6	1	7
3.—Diseases of Respiratory Organs																					
Laryngitis	2	..	1	2	3	2	1	..	1	..	..	..	..	..	..	..	2	..	5	2	7
Bronchitis	53	37	42	37	95	74	2	2	..	5	16	20	26	35	5	3	47	67	142	141	283
Pleurisy .. .. .	..	..	..	1	1	1	..	..	1	1	2	1	..	..	..	..	3	2	4	3	7

Pneumonia	20	23	24	34	41	57	5	5	11	8	8	5	16	6	..	..	40	21	84	81	564
Asthma and Emphysema .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	..	4	..	4	..	4
Group .. .. .	..	1	6	6	6	7	1	..	..	..	..	..	..	..	..	..	..	1	6	8	14
Other diseases of Respiratory Organs	1	3	1	..	2	3	..	3	..	1	3	3	2	1	..	..	5	5	7	8	15
4.—Diseases of Digestive Organs.																					
Gastritis .. .. .	..	1	..	..	..	1	..	..	..	1	1	..	..	..	..	..	1	2	1	3	4
Other Diseases of Stomach	1	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	2	1	2	3
Enteritis .. .. .	..	3	..	..	3	..	..	1	..	..	..	1	1	..	..	2	1	3	4	6	10
Peritonitis	2	..	..	..	2	..	..	3	..	5	1	1	1	..	..	..	2	8	4	8	12
Ascites.. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Obstructive Diseases of Intestines .. .. .	..	1	..	..	..	1	2	3	1	1	2	3	2	2	..	..	7	6	7	7	14
Fistula .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Pancreas Disease, &c. .. .. .	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	1	1
Cirrhosis of Liver .. .. .	..	..	..	..	..	..	..	3	1	..	4	3	2	1	..	..	1	4	7	4	11
Jaundice, and other Diseases of Liver	1	1	1	1	1	2	..	4	2	..	2	4	1	5	..	1	8	10	9	12	21

5.—Diseases of Urinary Organs.

Nephritis .. .. .	..	..	2	2	2	2	..	1	1	1	1	4	1	..	..	..	3	6	5	8	13
Bright's Disease (Albuminuria) .. .. .	..	..	..	..	..	..	1	1	1	1	3	3	3	2	..	..	10	10	10	10	20
Diseases of Bladder or Prostate .. .. .	..	..	..	..	..	..	..	..	1	..	..	..	3	..	..	..	4	..	4	..	4
Calculus (Stone).. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Other Diseases of Urinary System	1	1	1	2	2	..	..	3	1	..	3	..	2	2	..	..	6	2	8	2	10

6.—Diseases of Reproductive System.

(a) ORGANS OF GENERATION.

Male Organs .. .. .	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	1	..	1
Female Organs .. .. .	..	..	..	..	..	..	..	..	..	8	..	2	..	..	..	..	1	10	..	10	10
<i>(b) OF PARTURITION</i>																					
Abortion, Miscarriage .. .. .	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1	1
Puerperal Convulsions .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Placenta Previa, Flooding .. .. .	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	4	..	4	8
Other Accidents of Childbirth.. .. .	..	..	..	..	..	..	..	..	..	8	..	..	..	..	..	..	..	8	..	8	8

Deaths continued.

	0 to 1		1 to 5		Under 5		5—20		20—40		40—60		60—80		80 and upwards.		Over 5		All Ages		Total
	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	
7.—Diseases of Integumentary System.																					
Phlegmon .. .. .	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	1	1
Ulcer, Carbuncle .. .. .	..	..	..	..	..	..	..	..	..	..	1	1	..	..	..	..	1	1	1	1	2
Other Diseases of Skin, &c. .. .	..	2	..	..	..	2	..	..	..	..	..	..	1	..	..	..	1	..	1	2	3
8.—Diseases of Bones and Joints.																					
Caries and Necrosis	1	..	..	..	1	..	..	1	..	..	..	..	..	..	..	..	1	2	1	3	3
Arthritis, Osteitis, Periostitis .. .. .	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	1	1	1
Other Diseases of Bones and Joints .. .	..	1	1	..	..	1	..	1	..	..	..	..	..	..	..	..	1	1	2	3	3
9.—Diseases of Organs of Special Sense.																					
Ear, Eye, Nose .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
10.—Diseases of Lymphatic System, &c.																					
Lymphatics and Spleen .. .. .	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	1	..	1	1
Bronchocele, Addison's Disease .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Quinsy .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
Class VI.																					
DEVELOPMENTAL DISEASES.																					
Premature Birth.. .. .	54	45	..	..	54	45	..	..	..	..	..	..	..	..	..	..	..	54	45	99	99
Atelectasis	2	1	..	..	2	2	..	..	..	..	..	..	..	..	..	..	..	2	2	4	4
Congenital Malformations	2	1	..	1	2	2	..	..	..	..	..	..	..	..	..	..	..	2	2	4	4
Teething	8	6	2	5	10	11	..	..	..	..	..	..	..	..	..	..	..	10	11	21	21
Atrophy, Inanition, Debility	112	100	9	8	121	108	1	..	..	..	..	..	..	..	..	..	..	121	109	230	230
Old Age .. .. .	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	99	99	171	171
178	154	11	14	189	168	..	1	..	..	..	..	38	59	34	72	100	261	268	529	529	

DEATHS FROM VIOLENCE.

1.—Accident or Negligence.

[illegible]

2.—Homicide.

Manslaughter		.	.	.	.	.	.	I	I	I	I	. . .	..	2	2	2	+
Murder		.	.	.	.	.	.	.	I	.	.	.	.	..	I	..	I
		.	.	.	.	.	.	.	.	Exe cuti on	I	.	.	..	I	..	I
		.	.	.	.	.	.	.	.	.	I	.	.	II	2	12	
		.	.	.	.	.	.	.	.	5	I	I	.	II	2	12	
		

3.—Suicide.

3.—Suicide.

Class VIII.

DEATHS FROM ILL-DEFINED
AND NOT SPECIFIED CAUSES.

(e.g., Dropsy, Abscess, Tumour, Hemorrhage, Mortification, Death from Natural Causes. &c.)

5	+	1	..	6	+	2	2	2	2	7	1	5	2	2	..	18	7	24	11	35
5	+	1	..	6	+	2	2	2	2	7	1	5	2	2	..	18	7	24	11	35

	Class I.	Zymotic diseases	..	..	146	123	66	51	212	174	11	11	8	13	9	8	6	8	..	2	34	42	246	216	462
"	II.	Parasitic diseases	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
"	III.	Dietic diseases	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	1	2	1	3	3
"	IV.	Constitutional diseases	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	142	167	194	205	399
"	V.	Local diseases	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	10	335	340	637	576	1213
"	VI.	Developmental diseases	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	40	72	100	261	268	529
"	VII.	Violent Deaths	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	34	22	44	37	81
"	VIII.	Ill-Defined &c.	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	18	7	24	11	35

Totals:

557	454	215	181	772	635	60	71	127	159	187	189	215	207	47	53	636	679	1408	1314	2722
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INDEX.



	PAGE.		PAGE.
Adulteration of Food, &c.	104	Gas Impurities	51
Ages of persons suffering from Scarlet Fever	94	Hospital, Fever	63
Air, Micro-organisms in	19	Houses, Unhealthy	47
Anthrax	32	Houses, Lodging	49
Analyst's Report	104	Houses, Slaughter	50
		House to House Inspection ..	53
Bacteriological Observations of			
Air	19	Ill-defined Causes of Death ..	101
Baths	46	Illegitimacy	83
Bakehouses	50	Infectious Disease Notification	8
Births	72	Infectious Disease, Prevalence of	10, 88
Causes of Death	84	Inspector's Report	55
Chief Inspector's Report	55	Inhabited Houses	72
Cremation	43	Infant Mortality	80
Constitutional Diseases	98	Isolation of Infected Persons..	14
		Inquests	102
Deaths from Ill-defined Causes	101		
Deaths and Death Rate	7, 75	Legislation, Sanitary	52
Developmental Diseases	101	Lodging Houses	49
Diarrhoea	17, 96	Local Diseases	100
Dietic Diseases	98		
Diseases of Animals	31	Marriages	72
Diseased Meat	32, 50	Measles	13, 91
Disinfectants with street water- ing	17	Meat, Diseased	32, 50
District Mortality	83	Milk Analysis	105
Diphtheria	11, 95		
Epizootic Diseases	31	Notification Infectious Disease	8
Erysipelas Cases	16, 98		
Estimated Population	7	Offensive Trades, &c.	51
Expenditure at Fever Hospital	67	Open Spaces	44
Fever, Puerperal	16	Parasitic Diseases	98
Fever, Hospital	63	Parks, &c.	44
Fever, Typhoid	12, 96	Patients in Hospital	63
		Plumbers, Registration of	54

	PAGE.
Population, Estimated	7
Presents to Hospital	69
Prevalence of Infectious Disease	10
Public Baths	46
Puerperal Fever	16

Rabies	32
Report on Prevalence of Diarrhoea	18
Recreation Grounds	44
Report of Analyst	104

Sanitary Inspector's Work, 53,	55
Sanitary Legislation, 1887....	52
Scarlet Fever Cases	11, 93
Sewers of Borough	35
Sickness from Infectious Disease	88
Slaughter Houses	50
Smoke Nuisance	51
Small Pox	13, 90

	PAGE.
Swine Fever	31
Symptoms of Rabies	33

Typhoid Fever Cases	12
---------------------------	----

Unhealthy Dwellings	47
Unwholesome Meat	32, 50
Uncertified Deaths ..	102

Vaccination	74
Ventilation of Sewers	35
Ventilation of Houses.....	48
Violence, Deaths from	101

Water Analysis	106
Watering of Streets	17
Whooping Cough.....	13, 95
Work of Sanitary Department	55

Zymotic Diseases.....	87
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LEICESTER
FROM A SPECIAL SURVEY.
1888.

SHOWING LOCALITIES OF DEATH FROM THE FOLLOWING DISEASES:

DIARRHOEA	...	X
SCARLET FEVER	...	●
TYPHOID FEVER	...	●
DIPHTHERIA	...	●



